BIRTH ORDER, FAMILY SIZE, AND SEX DIFFERENCES IN RISK-TAKING AND CONFORMITY BEHAVIOURS.

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by

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"..... the first born according to his birthright, and the youngest according to his youth ....."

- Genesis 43 : 33.

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INTRODUCTION

Societies of many periods and diverse locations have often accorded birth order an almost mystical status as a determinant of subsequent individual development and social advantage. This is implied for instance in a most pervasive phenomenon of many cultures, namely that which the historian Gibbon has referred to as "the insolent prerogative of primogeniture."

Although birth order has long had an enduring interest for writers, commentators and parents, it is only within the last century, and the last few decades in particular, that a more scientific interest in the topic has been evidenced. The first study, which was distinctly scientific if not strictly psychological, was that of Francis Galton's (1874), this being in turn followed by the works of Havelock Ellis (1904), Cattell (1921), and Terman (1925). Galton found, as did Cattell fifty years later, that first borns were more frequently represented among eminent scientists than later borns, whilst Ellis found that this trend held for both first and last borns. Terman similarly found a preponderance of first borns in his sample of intellectually

superior children.

Of these studies, it was Terman's which furnished psychology with the most useful data. Terman's interest in birth order subsequently waned, and so reflected to a degree, the interest of experimental psychologists. Some studies prior to the 1940's did focus upon birth order as a variable, (Rosenow and Whyte 1931), while others (Burt 1925) made explicit or implicit mention of it as a contextual variable. Suffice to say that this research was largely unco-ordinated, in that a common reference point or theoretical orientation was lacking. Murphy Murphy and Newcomb (1937) reviewed some fifty studies relating to ordinal position and concluded that the results of these researches on relationships between birth order and variables such as intelligence, academic achievement, political attitudes, happiness and emotional stability, were inconclusive and contradictory.

Experimental interest in the topic continued to be spasmodic, and the following twenty years saw research on birth order concentrated largely upon relationships to

personality types (Koch 1954, 1955, 1956, McArthur 1956), or as a variable of greater or lesser importance in studies of child rearing and development (Sears 1950, Sears Maccoby and Levin 1957, Whiting and Child 1953).

During the first half of the century, psychoanalytic theorists had given some limited attention to this topic, in a fashion far removed from the empirical, although often picturesquely described. Freud (1938) mentions in passing "There is probably no nursery without violent conflict between the inhabitants.....Among other things, you will infer from this that a child's position in the sequence of brothers and sisters is of very great significance for the course of his later life." Rank (1929) stresses the advantages of the last born. "His superiority really consists in the fact that (in having access to his mother) he is like the father with whom he alone....is able to identify himself." Adler (1927) on the other hand stresses the advantages of being first born, with the older child striving to maintain his power and the younger goaded by his inferior status. "The situation has been described in a very lively

fashion in the Biblical legend of Esau and Jacob," Adler suggests. He finds "...the attitude of the second born is similar to the envy of the poor classes. There is a dominant note of being slighted, neglected in it."

Research on the topic of birth order received a more experimental impetus and a source for a developing theoretical continuity in 1959, with the publication of Stanley Schachter's "The Psychology of Affiliation." This publication recorded research, which had begun as a carefully controlled investigation into the relationships between isolation, anxiety, and affiliative tendencies, and which had ended as an example of empirical serendipity. The initially unpredicted finding, was the emergence of ordinal position as an important variable operating in the affiliation context. Schachter presented laboratory studies and real life analogies which supported the data. His explanatory system was largely in terms of differential parental socialization of offspring of varying birth-orders, as had been suggested a decade earlier by Sears et al.

Since 1959, many studies have been published which have

received their impetus largely from Schachter's work. These studies have investigated the relationships of birth-order to many variables - affiliation (Gerard & Rabbie 1961, Radloff 1961); college attendance (Altus 1965); conformity (Dittes 1961, Becker et al. 1962, 1964, 1966); volunteering (Capra & Dittes 1962 Suedfeld 1964); anxiety and fear (Sarnoff & Zimbardo 1961), to name but a few. In addition to these variables which have received continuing attention, many isolated studies have used birth-order relating it to variables as diverse as extra-sensory perception (Green, Eastman & Adams 1966), age at marriage (Murdoch 1966), the experimenter effect (Rosenthal, Kohn, Greenfield & Carota 1966), and the behavioursof national leaders (Harris 1964).

In spite of the large number of studies over the past six years, the status of birth-order as a psychological variable has not changed greatly from that accorded it by Murphy Murphy and Newcomb in 1937. The results of many studies are still inconclusive and contradictory, although not all findings are negative, as some agreement and consistency is evident.

One application of research on birth-order has been in relationship to conformity and dependence. Schachter's original theoretical formulation suggested that the affiliative tendency was but a particular instance of a generalized relationship between ordinal position and dependence. He assumed that dependent behaviour would be most strongly manifested under conditions of disturbance and anxiety, but that there should be non-anxiety indicators which also exhibited the relationship. Later studies have probed this area, investigating the links between birth-order and dependent behaviour (Haeberle 1958), influencibility (Ehrlich 1958), vulnerability to peer acceptance (Dittes 1961), and conformity (Staples & Walters 1961, Becker & Carroll 1962, Becker Lerner & Carroll 1964, 1966 Arrowood & Amaroso 1965, Sampson 1962 Walters& Ray 1960). The present study is a continuation of research in this area.

Ignoring temporarily Sears' (1950) admonition, that ordinal position is an ecological variable rather than psychological, a question may still be posed. Does any similar variable, (ecological or psychological) deserve attention in a context with ordinal position? Obviously many

related variables such as sex of siblings, sibling interval, family size, kin interaction, could be, and have been shown to be relevant in some studies (Irish 1964). Rosen (1961) suggests that "a disproportionate degree of attention has been concentrated on the first born" in making a plea for a consideration of other related variables. One he instances as did Schachter (1959), and one which figures prominently in this current study, is family size.

This variable has not had the research attention that ordinal position has received, and its history is rather one of isolated and spasmodic research findings which have attempted to link the variable to e.g. achievement motivation, (Rosen 1961) personality traits, (Stagner & Katzoff 1936) childrearing practices, (Elder & Bowerman (1963) and academic achievement (Buesman 1928, 1930). One possible exception to the trend noted can be found in the work of Bossard et al. (1952, 1955, 1960) who has given some limited continuity to research in this area.

In the last decade, studies in decision-making have occupied considerable space in the literature of experimental psychology. One aspect of decision-making, which

has a growing research backing, relates to risk-taking behaviour, work which has been influenced greatly by the contributions of Kogan and Wallach and their collaborators (1959, 1960, 1961, 1962, 1964) and on a more generalized level by Slovic (1962, 1964, 1966), Coombs (1960) and Atkinson (1957). Apart from their intrinsic interest, studies in decision making in general, and risk-taking in particular, are of importance due to the wide applicability of their findings to many research areas in psychology and to applied fields in the extra-laboratory world.

It seemed, intuitively, to this writer that some aspects of recent research in relation to birth-order, family size, and risk-taking and conformity behaviours could be meanginfully developed in a further study. In brief, the research would investigate relationships between birth order and conformity behaviour in an experimental situation quite different from those previously undertaken, and would include family size (Gregson 1966) as a probable contextual variable. The second major emphasis in this research would be to see if the familiar ordinal position - dependent behaviour link would occur with individual risk-taking as a

dependent variable, as research (Kogan & Wallach 1964) tentatively showed that independence and risk-taking behaviour were related. Finally, analysis of possible sex differences would confirm or reject previous findings in relation to risk-taking and conformity behaviours.

The remainder of this research report is presented as follows. Chapter one includes a review of the relevant literature on birth-order, while chapter two presents a similar review of the literature on conformity. Then follows a review of the studies which examine conformity in relationship to birth-order, and in chapter four, a brief review of the literature on family size. Chapter five presents a review of those studies in risk-taking behaviour which are relevant to the present research. The following chapter deals with the present study, its rationale and the hypotheses to be tested. Chapter seven deals with the experimental design and procedure, and is followed in the next chapter by the experimental results. These results are discussed in chapter nine and conclusions and implications are drawn in the following chapter. The final chapter contains a summary of the study. The research report concludes with a bibliography and an

appendix which contains additional details of the experimental investigation.

CHAPTER 1

A Literature Review of Birth-Order

The research literature on ordinal position as an experimental or analytic variable presents a picture of conflicting results. This confused picture may be a consequence of birth-order being a varable which lacks predictive validity. It could also result from inadequacies in method and measurement. As one instance, it is possible to cite problems of definition of the term.

Definition of Birth Order:

The simplicity of definition is more apparent than real. "Birth-order is the sequential position of a person among his or her siblings with respect to order of birth" (Warren 1966). The simplicity ceases when subjects are categorized for comparison. Some possibilities of division are:-

1. First Born v all Later Born
2. First Born v Youngest
3. First Born v Youngest v Intervening Sibs
4. First Born v Only Children
5. First half of sibship v Second half

The confusion in experimental results, could be, in part

due to difficulties in comparing apparently equivalent ordinal groups which in fact do differ. This differential basis of grouping is partly a function of the theoretical assumptions investigators hold with regard to what factors give rise to ordinal differences, a point to which this writer will later return. The problems of extracting a firm theoretical basis are compounded by the lack of information concerning the rationale for contrasting experimental groups, an inadequacy which typifies many of these studies.

Birth-Order Reviewed:

Distinctly psychological research on birth-order, apart from a few isolated studies, (Garman 1898, Winter 1897, Friedjung 1911) did not develop in any great volume until the mid 1920's. The next decade was characterised by many studies, attempting to relate birth-order as a variable to dependent variables as diverse as delinquency (Armstrong 1933, Baker et al. 1929, Burt 1925, Parsley 1932, Sletto 1933) intelligence (Arthur 1926, Blonsky 1930, Goodenough 1930, Hsiao 1931, Thurstone & Jenkins 1929). Various personality measures from clinical data and/or

personality scales (Bender 1928, Eisenberg 1937, Fenton 1928, Guilford & Worcester 1930, Ross 1931, Sewell 1930, Wile & Moetzel 1931), problem behaviour (Blatz & Bott 1926, Rosenow 1930, Ward 1930, atheism (Vetter & Green 1932) stuttering (Hlon 1932) and manic-depressive psychoses (Berman 1933). These and many other studies were reviewed by Murphy Murphy and Newcomb (1937) who concluded that the research results to that date appeared inconclusive or contradictory. The reviewers were most pessimistic of the psychological utility of research into birth-order differences, - a pessimism which is still to be found among some current social psychologists (Glass et al. 1963).

An illustration can be taken from Murphy et al.'s summary. Of the six studies reviewed, which attempt to relate birth-order to intelligence, three report no ordinal differences, one a slight trend favouring younger children, one favouring only children and one which suggests a trend for intelligence to increase with birth-order. One weakness of the Murphy et al. review is the omission of testing devices used to derive intelligence scores in four of the studies, and this weakens their "inconclusive" verdict.

Since the 1930's, three major lines of development in birth-order research can be discerned.[1]

The first line of development, which followed earlier studies such as Bender (1928), Guilford & Worcester (1930), Ross (1931), has dealt with relationships between various birth-order positions and personality trait variables. As with the former studies, a mélange of results emerges.

Stagner and Katzoff (1936) found that differences in birth-order did not result in significant differences in Bernreuter personality scores for 430 male students. McArthur (1956) however did find some ordinal differences among Harvard students and their siblings in his study using clinical interviews, questionnaires and self reports. First borns were more adult oriented, studious and less gregarious than later borns who were more peer oriented. A follow-up of the students, fourteen years later, indicated similar patterns among the children of these alumnae.

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[1] This in no way suggests that the three developed and remained separated. Indeed rather the reverse is so, as will be shown. The application of findings across these lines of development adds strength to the arguments of the investigators. The studies are treated separately in this thesis merely as an aid to developmental clarity.

The most intensive study of birth-order - personality relationships was that undertaken by Koch (1954, 1955, 1956). She divided 384 five and six year-old children from intact 2 child families into 24 matched groups (Sex x Sex of Sibling x Position x Age difference of siblings). Groups were controlled for age, socio-economic class of parent and residential area. Among the results relevant to this context, Koch found some ordinal differences on the dependent variable - teachers' ratings of personality traits. First borns "recover less well from upsets", are more concerned over defeat, and yet are rated as being more self confident. Second borns are more aggressive, are more ready to express anger and "have more nervous habits". In a further paper Koch finds first borns are more competitive in attitudes to peers, a finding which is partially contingent on sex and the age difference of siblings.

Another important study was that of Rosenberg and Sutton-Smith (1964). They attempted to relate sex-role identification and ordinal position. This study was influenced by Koch's to a considerable degree, although a more theoretical formulation was attempted within a generalized reinforcement framework. From their original

sample of 900 4th-6th grade children, Rosenberg and Sutton-Smith investigated 19 only children, 134 children from two-sibling families, and 199 from three sibling families. From the detailed results which emerged, many were in agreement with those presented by Koch and Brim (1958), (who had conducted a further analysis of Koch's original data), indicating that despite the acknowledged lessening of controls in Rosenberg and Sutton-Smith's study, the research did seem to possess some replicative validity. The differences e.g. the reversed sex differences in anxiety, are explained in terms of age differences. Boys show greater anxiety than girls at six years (Koch & Brim) but this is reversed at age ten (Rosenberg & Sutton-Smith). However, the major finding to emerge from the Rosenberg and Sutton-Smith study, is the importance of family size as a variable. In every case ordinal differences are contingent upon family size. As the authors suggest "These differences indicate that recent studies that compare first born children with all non-first born children, without regard to family size may conceal more information than they reveal."

An interesting study was conducted by Yoda and

Fukatsu (1963) who administered a 94 item questionnaire to ten-thirteen year old Japanese children and their parents, in a study of ordinal position. The study rationale was based on the assumption that the strong Japanese cultural factor of primogeniture should produce marked birth-order differences. They showed that ordinal differences were indeed apparent. First borns tended to be more self controlled, less talkative, thorough in working, reserved, and to shun company, while second borns were more talkative, obstinate, dependent, opportunist and jealous. The authors suggest that the differences are due to a combination of differing parental role expectations for first and second borns, differing self perceptions of the two positions and variabilities in the early socializing environments.

Recently, some attention has been given to the relationship of birth-order to achievement need (n'Ach.) as a personality trait. Two studies have attempted to relate ordinal position to a dependent variable on projective tests, said to equate with achievement need. Rosen (1961), using a T.A.T. type device (McClelland et al. 1953) found

first borns had higher n'Ach. scores than later borns. Sampson (1962) found a similar result using French's (1958) Test of Insight, on thirty-one male and thirty female subjects. However it should be noted that Rosen, like Rosenberg and Sutton-Smith, found that family size was a more significant variable than ordinal position as such. He notes that achievement motivation decreases as family size increases, a trend which holds for fourteen of the sixteen cells containing entries in the birth-order x family size x social class table (3 x 3 x 2). It should be stressed that any link between birth-order and achievement motivation derived in this fashion is subject to reservations concerning the validity of such projective measures. It appears to this writer, that simulation techniques, giving behavioural measures of achievement motivation, such as that of Rosen and D'Andrade (1959), offer a more promising approach to the problem.

From these studies, the most significant factor to emerge in terms of relevance to the present study is the incidental finding that family size is an important contextual variable (Rosen 1961, and Rosenberg & Sutton-Smith 1964).

This supports the observation passed to this writer by Gregson (1966). Furthermore the effect of different age groups has been shown to be a factor worth considering (Koch 1956, Brim 1958 and Rosenberg & Sutton-Smith 1964). Finally Yoda and Fukatsu (1963) offer evidence that cultural differences may influence results. This interpretation receives some support with their finding of increased dependence in second borns, a finding which conflicts with the common first born - dependence link, found in many Western studies c.f. Schachter (1959), Haeberle (1958).

The second major line of development in birth-order research since the Second World War has been in the field of theoretical explanations of birth-order differences. Two possible causal determinants have been suggested (Warren 1966).

1. Physiological - in which research has pointed to physiological variables such as changes in intra-uterine environment due to the mother's age or number of pregnancies, and suggesting that such variables may have effects of varying permanence

for subsequent development. Montagu (1963).

2. Social - in which research or theorizing suggests birth-order and personality or behavioural differences are related by a "social" nexus as an intervening variable. Development theorists, Sears (1950), Sears et al. (1953, 1957), Whiting and Child (1953), Lasko (1954) view the ordinal effects as resultants of differential socialization by parents. For them, the child-rearing practices are the genesis of many phenomena, and ordinal differences are but one manifestation of the resultant effects. A second group of theorists, Brim (1958), Rosenberg and Sutton-Smith (1964), Rosen (1961), Irish (1964) are primarily interested in the ordinal position - personality/behaviour relationship and merely speculate or theorise upon the causal factors underlying the relationship. Because of their relevance to this current study it is considered desirable to review studies from these two groups in more detail.

Sears, Maccoby and Levin (1957) conducted an extensive

study into child-rearing practices, based on an analysis of interviews of 372 mothers of 5 year old children. They found, as a result of this analysis, that parental practices and attitudes did vary according to the birth-order of the child. e.g.

1. Parents delight at pregnancy - first born > middle > youngest ($p < .01$)
2. Percentage breast-fed - first born > middle > youngest ($p < .01$)

Data such as these would certainly seem to indicate some diminishing in positive sentiment by parents as the number of children increases. To generalize from Sears et al.'s results, which are relevant to ordinal position, it appears that the parental training of the first born is characterised by an inconsistency which is much less apparent in the training of later born children. The results show that parental behaviour to the first born is characterised both by considerable discipline, and considerable permissiveness. For later borns, although both patterns exist, they are less extreme and the parents' behaviours are more consistent.

This effect is increased by the operation of a further

factor. One may plausibly expect that with a first child, parents, being still inexperienced and insecure in the parental role, will respond more quickly to stimuli such as an infant's cry. This may lead to overprotection, trial and error behaviour and further behavioural inconsistency.

As Schachter (1959) points out, these factors suggest differing psychological environments for first and later born children, with first borns experiencing greater inconsistency of treatment and relative overprotection. Schachter sees the result of this experience as the development of heightened dependence in first born as compared with later born children. Evidence from Sears, Whiting, Nowlis and Sears (1953) and Whiting and Child (1953) offers some support, when on the basis of their studies, they suggest that the development of dependency needs is contingent upon two factors.

1. Generous amounts of attention and love bestowed on the infant.
2. Frustration of dependency needs.

This tends to tie in neatly with the Sears et al. (1957)

findings relating to the treatment of first born children by parents.

To summarize then, Sears et al. (1953, 1957) and Whiting and Child (1953) would suggest that ordinal position differences are causally related to child-rearing practices adopted by the parents. A similar orientation is adopted by Henry (1957), who sees the importance of the role of the male parent as a discipline figure, and Lasko (1954) who agrees with the Sears et al. findings of inconsistent treatment for the first born child.

The second group of theorists, focuses largely upon the ordinal position - behaviour/personality relationship, and after establishing links of greater or lesser significance, theorise, or merely speculate, upon the intervening variable, either on the basis of research or as an echo of a personal disciplinary standpoint.

Irish (1964) suggests the importance of sibling interaction as a determinant of ordinal position - personality differences, and feels that studies which focus solely upon parental treatment of children as the determinant, are

somewhat limited. This viewpoint receives some support from the non-experimental psychoanalytic theorists of the Adlerian school and from Sletto (1934) who had suggested that personality differences might be attributed both to divergent roles played in sibling interaction, as well as dissimilar parental treatment. A similar position is adopted by Rosen (1961).

Bossard and Boll (1955) see that ordinal differences become more apparent as family size increases, this being due to increased specialization of role. They identified eight characteristic roles e.g. "the responsible one", "the isolate", "the popular one" in their investigation of 879 children. The same authors (1960), suggest the sheer size of the family affects any ordinal differences. Thus their intervening variable is expanded to include role specialization as a causal factor.

Rossi (1965), takes a wider view of the socialization process to include the kin group. She sees the first born as possessing some social advantages both in the nuclear family and kin group. First borns assume a particular

importance to parents and relatives and this is communicated to the child, who becomes more motivated to achieve, seek praise and rewards from adults rather than peers, and so begins schooling with a motivational drive and attitude to authority which are already conducive to success. Rossi sees that the developmental sequence for girls can be somewhat different as frequently the expected role for a female first born is integrative and adaptive, turned inward toward family and kin and not to extra-familial achievement.

Brim (1958) hypothesises that interaction between two persons leads to assimilation of roles, that is, to the incorporation of elements of the other's role into the actor's role. Rosenberg and Sutton-Smith (1964) accept this to a point, but feel that the assimilation hypothesis does not predict as well as the reinforcement model they suggest. Their model suggests ordinal differences occur as a result of differential reinforcement patterns for first born as opposed to later born children. This reinforcement is of three types - primary (referring to direct reinforcement by others as a result of attention approval etc.), secondary (including behaviours that are rewarding because they

are associated with the activities and agents of rewards, particularly the parents), and vicarious (involving the notion that the imitation of behaviour that is successful in others is indirectly reinforcing to the imitator.). This theorising fits reasonably well e.g. with the previously mentioned formulation of Schachter (1959) relating to dependency development. The comparative overprotection accorded the first born by the mother associates anxiety reduction with affiliation. This suggests, as had Sears et al. and Lasko, that the child's dependency on others is being directly reinforced. As will be shown this dependency response becomes generalized to expecting anxiety reduction from others. Later born children, experiencing less of the initial parental attention, develop a weaker dependency response.

In summary, the major causal factor in birth-order differences is seen to be in the socialization process of the child. If the major causal variable in birth-order differences was physiological, it could be expected that ordinal behavioural or personality differences would hold in cross-cultural settings, though techniques of

multivariate analysis might be required to partial out such parallels from amongst superimposed cultural differences. The problem is more readily conceptualized than analysed empirically, because of the complexity of controls and measures required once a multivariate causal model is postulated here.

Some theorists (Sears et al. Whiting & Child, Lasko, Murray) see socialization predominantly in terms of parental child-rearing practices, whereas others, while not denying the importance of the parents' influence include sibling interaction (Irish, Rosen), family size (Bossard & Boll) and the wider kin group (Rossi). Brim and Rosenberg and Sutton-Smith proceed further, and suggest that this interaction between the child and the socializing agent results in ordinal differences due to differential role assimilation (Brim), or differential reinforcement patterns (Rosenberg & Sutton-Smith).

The third major line of development is traced from its genesis in Stanley Schachter's "The Psychology of Affiliation". Veroff (1960) describes the major finding

aptly and picturesquely "And then a result was uncorked that seems to be a real discovery. An old chestnut in social research, ordinal position in the family - one that has been roasted over and over until it seemed doomed to a dead storage bin - suddenly emerges as one of great consequence." Because of its pivotal importance, the research will be reviewed in some detail.

Schachter had noted in studies of social isolation, that subjects had developed a psychological state approaching "a full blown anxiety attack." He hypothesised that if conditions of isolation produced anxiety then conditions of anxiety would lead to the increase of tendencies to affiliate. After two well-designed experiments, in which anxiety was manipulated by having subjects anticipate a severe electric shock or a "mild tickle", Schachter was able to show that indeed the tendency to affiliate increased as anxiety increased, and that the trend was directional, i.e. that highly anxious subjects chose to affiliate with others they believed to be in the same position. As Schachter himself put it, "misery loves miserable company." It should be noted that the dependent variable - "desire to

affiliate" was defined as "choosing to be with others rather than being alone", following the anxiety manipulation. This is obviously a much more highly cognitive act than the generalized affiliative behaviour, typical of the extra-laboratory world.

Although the differences between experimental groups were highly significant for the first and second experiments, the third experiment, which examined the effect of restricted communications upon the relationship, did not yield the expected results. Only after an internal analysis on extreme high-anxiety and low-anxiety subjects did significant results emerge. Schachter rejected the view that this was due to inadequate manipulation of the independent variable and supported this by independent measures of manipulated anxiety. He concluded that the effect was due to a sampling error in his subject group. He suggested that the resultsof the third experiment, which had not followed prediction, were due to an over-representation of subjects who are usually prone to affiliate, in the low -anxiety condition. Schachter was, in effect, suggesting that some people were normally more

affiliative than others and that these were over-represented in the low-anxiety condition, thereby confounding his experimental manipulation and, ultimately, the results.

Working on an intuitive basis, Schachter suggested that the sample bias might be associated with ordinal position. First borns, he suggested, are socialized in such a way as to be more affiliative than later borns. Reanalysis of his subject groups supported the contention. He was able to show that first borns were over-represented in the low-anxiety condition and that first borns and later borns did exhibit different typical affiliative responses to anxiety. In brief, in high-anxiety conditions first borns desired to affiliate, whereas later borns did not, and that this result was anxiety specific.

Schachter was able to demonstrate that the effect was due to two factors. By reanalysing ratings of anxiety in his own experiment, and using data from a concurrent study (Schachter & Heinzelmann 1959), in which female subjects received shocks from two forty-eight volts until these were subjectively rated as unbearable, Schachter showed

that the level of anxiety, which could be manipulated, was higher for first borns than later borns. Secondly, by reviewing his own experiments, Schachter showed, that when the level of anxiety was held constant, first borns chose to be affiliative more than later borns.

Schachter briefly examined three additional variables to determine whether they affected the affiliation - anxiety relationship and concluded that family size, per se, had no effect, that there were no differences between first and only children and that absolute ordinal position had a strong relationship to the affiliative response of anxious subjects.

To indicate the generality of the ordinal position - affiliation link Schachter departed from the laboratory and examined three surveys of real life problems which supported his conclusions. He found first borns more committed to psychotherapy (Wiener & Stieper 1959), less prone to alcoholism (Bakan 1949) and less likely to be "ace" air-force fighter pilots (Torrance 1957). Schachter interpreted these data as supporting his findings. He suggested e.g. that therapy was an affiliative

response to anxiety, and was therefore more acceptable to first borns. As Veroff (1960) shows, this interpretation can be questioned, as therapy may represent a withdrawal from coping with more usual affiliative relationships. But Schachter realized that such data, while supporting his argument, was only suggestive, and by no means conclusive. Furthermore, this reasoning depended on there being no systematic relationship between the initial psychological disturbance - say a neurosis, and ordinal position.

In attempting to provide a theoretical basis for his research findings Schachter hypothesized that the causal factor lay in the child-rearing practices adopted by parents of first born children, contrasted with those used with later born children. As suggested previously in this review, he submitted that the findings of developmental theorists such as Sears et al. (1957), and Whiting and Child (1953) were harmonious with his research findings. The relative parental overprotection of, and the development of greater needs for dependence in first born children, predisposes them to seek affiliation in

situations of anxiety. Schachter suggested that the effect was further emphasised by the differential results from having siblings, for first and later born children. Psychoanalytic theories e.g. Adler suggested that the first born child is threatened by the later born and that this results in resentment and/or aggression toward the younger sibling. Schachter assumed that over a period the later born sibling perceived affiliation toward the first born as being more threatening than anxiety reducing, resulting in the negative reinforcement of dependency behaviour.

Schachter was aware of the limitations of such support for his research, and noted that independent experimental confirmation was needed which could identify dependence as a major variable mediated by ordinal position. He was able to turn to a study by Haeberle (1958). In the context of a larger study on dependence and aggression, Haeberle had analysed the relationships between ordinal position and dependence. Her subjects were three to six year old children all of whom had been diagnosed as mildly disturbed. Each group of ten to twelve children was rated

by two teachers on a variety of scales (Beller 1957) each relating to dependent behaviour. Ratings were summated to give a dependency score for each child. Haeberle found no indication of family size as a variable, although she notes that the sample size ($N = 63$), is too small for meaningful analysis. Ordinal differences were noted however. For boys and girls, and for boys alone, only children have higher dependency scores than first borns, who have higher scores than later borns ($.01 > p > .001$ and $.05 > p > .02$ respectively). The scores for girls alone were in the predicted direction, but were not significant.

Schachter believed Haeberle had confirmed the ordinal - dependence link in disturbed children, but did this relationship hold for normal subjects? He examined a study by Sears (1950), who had presented previously unpublished material by Dean (1947) in which first borns were rated more dependent than later borns, by their mothers in a paired comparison situation. Sears indicated that further support was offered by Gewirtz (1948) and Beller (1948), who found consistent differences suggesting first borns

were more dependent than later borns. On this basis, Sears concludes that ordinal position is related to dependency, a conclusion which Schachter takes as confirmation of this theorizing.

At this point, Schachter considered whether the data he had gathered on anxiety and affiliation were indicative of a unique relationship or just one manifestation of a more generalized dependence - ordinal position relationship. If the latter proposition held, other behaviours relating to dependence should show some relationship to ordinal position. Thus, if dependence was operationally defined as the extent to which others were used as sources of support and reference, it could be hypothesised that there would be a relationship between dependency and influencibility. First borns should be more influencible than later borns.

Data from Ehrlich (1958) confirmed this. Male college students were measured on shift of opinion in assessing a case study before and after being supplied with a false consensus assessment. The data supported the prediction, but only at the (χ^2 = 3.62 1 d.f.) .06

level. First borns did conform more to the group norm than later borns.

To summarize, Schachter, in a series of experiments concerned with the relationship of anxiety to the affiliative tendency, showed that first born subjects proved to be more anxious in a standard anxiety-provoking situation than later borns. When presented with the choice, anxious first borns chose to affiliate whereas equally anxious later borns did not. Real-life analogues were sought and supported the expectation that first borns would seek social means of handling anxieties while later borns would seek non-social means. The findings were formulated in terms of a relationship between ordinal position and dependence. It was assumed that dependent behaviour would be most strongly manifest in conditions of disturbance and anxiety but that there would be non-anxiety indications of such a relationship. Independent measures of dependence were shown to be systematically related to ordinal position with first borns consistently more dependent than later borns. A related construct, influenciblility, was demonstrated to be related to ordinal position. "It is anticipated that other dependency linked behaviours

will eventually prove to be related to ordinal position." (Schachter, 1959). It is from this prognosis that the current study traces its empirical descent.

This has been a comparatively detailed review of the aspects of Schachter's study which are relevant to this current research. As was suggested earlier, this forms the genesis of the third major line of development in birth-order research. In a sense, Schachter's work has provided both an impetus and a unifying influence in studies on birth-order as the three major lines have tended to merge with some attempts to integrate findings from each.

As a result, there have been many studies reported since 1960 which are to some degree Schachter-inspired. Some of these have been reviewed by Warren (1966) in an unfortunately rather superficial and unsatisfactory fashion. In addition there are the lineal descendants of the scattered studies typical of the 1920's and 1930's, where birth-order has been related to such variables as teaching style (Solomon 1965), with first born teachers being more critical and hostile than later born teachers; experimenter

differences (Rosenthal et al. 1966); age at marriage (Murdoch 1966)and the research participation of Peace Corp Volunteers (Armilla 1966).

One recent study, Kammeyer (1966), examined the relationship of feminine sex role to birth-order. Kammeyer found that first born girls, as compared with later born girls, are more oriented to the traditional feminine role. For example, first born woman students were more likely than later borns, to choose marriage over graduation, on questionnaire statements. Kammeyer, by referring to studies such as Rossi (1965), suggests that ordinal differences may be linked to cultural role expectations. The first born is likely to "possess some awareness of his position of importance" and responsibility, to the kin group. For the first born boy or girl this may result in greater motivation and dominance. The socio-psychological traits may be similar for both sexes, but they find outlets in activities, which are culturally determined. It seems reasonable, if the Kammeyer and Rossi position is adopted, that behaviours which are typical of first born children will be these which are congruent with cultural expectations. These may not necessarily be those

which result from sibling interaction and parental inconsistency. (Schachter 1959). Later studies may indeed be able to manipulate variables to contrast the Kammeyer-Rossi and Schachter hypotheses.

One of Veroff's "old chestnuts" has reappeared, largely as a result of a further Schachter (1963) study, namely the relationship of birth-order to academic achievement. Schachter (1963), on the basis of an analysis of university populations, found first borns to be over-represented in colleges, a trend which was even more marked in graduate schools, but non-existent in high schools. Thus the reported relationship of eminence : birth-order, (Galton 1874, Cattell 1921, Ellis 1904), was found to be a function of the tendency for eminent people to come from college populations. Altus (1965) agreed with Schachter's findings which also received some support from Stewart (1963) who found in a survey of 7000 London children that first borns were more likely to remain at Grammar School beyond the minimum leaving age, than later borns. One negative finding, Chopra (1966), failed to discover any relationship between ordinal position and

academic achievement as measured by public examinations, or intelligence test scores on the Ravens P.M. Test, in his study of 1359 fourteen to seventeen year-olds in India.

However most post-Schachter (1959) research has concentrated on problems more closely connected with his theoretical formulations. Three lines of research interest have developed which have examined:

a. Affiliation as a variable.

b. Anxiety as a variable.

c. Relationships between ordinal position and non-anxiety indices of dependence, particularly conformity.

Radloff (1961) manipulated the type of information female subjects received regarding their opinions on an issue vis-a-vis a group consensus. He found no clear differences between birth-order groups on a desire to join a discussion group on the issue, but did find within ordinal groups differences according to conflict or agreement with the group. Also, Gerard and Rabbie (1961) showed that the predicted ordinal position affiliation relation-

ship held for first born women, but not for first born men. Three studies, Conners (1963), Dember (1964), and Staples and Walters (1961) similarly give conflicting results in measuring affiliation need by T.A.T. techniques. Conners found no difference between first and later borns but did note that only children had higher n'Aff scores. Dember found first born women scored higher than later born women, while the male differences were not significant. Staples & Walters found first borns of both sexes were higher in measured n'Aff. Singer and Shockley (1965) could find no birth-order differences in an affiliative response, in a non-threat choice of waiting alone or with a group for an experiment. Schachter (1964) showed in a natural setting of fraternities and sororities that first borns select popular peers, in a situation involving sociometric choice, more often than do later borns.

To conclude then, it appears that the affiliation - ordinal position link is much stronger for female subjects than male subjects. For this latter group, experimental inadequacies and conflicting results suggest that additional variables may operate. It should be noted that

in his original experiments, Schachter used female subjects, and this tends to limit the degree to which his results can be generalized as they could be contaminated by cultural sex role expectations.

Some studies have focussed research on the stress variable - anxiety, and the balance of the results shows a trend to supporting Schachter's contention, that the presence of stress will increase the ordinal position - affiliation link, although there have been some negative findings. Sarnoff and Zimbardo (1961), without regard to birth-order, and using male subjects, refined Schachter's "anxiety" by employing two terms "fear" (which approximated Schachter's anxiety) and "anxiety" (which had a psychoanalytic flavour and was induced by expecting a public sucking response). They found that high fear increased an affiliative tendency and high anxiety decreased it. Staples and Walters (1961) confirmed the Schachter hypothesis in their study with female students, when first borns, expecting to be shocked, proved more susceptible to group pressure in an autokinenic situation than did first borns under no threat of shock and later borns in both conditions. Singer and Shockley (1965) in their experiment

on female subjects showed no birth-order differences in anxiety or affiliation in a non-threat situation.

Studies in volunteering, which tend to focus upon both affiliative and stress variables, again produce conflicting results. Some studies, (Capra & Dittes 1962, Suedfeld 1964, Varela 1964) found first borns over-represented among volunteers for experiments, but this has not been confirmed in later studies (Wolf & Weiss 1965, Ward 1964, and Wilson Patterson & Lysons 1966). These situations are not always comparable, as experiments may be group (Varela), or isolation (Suedfeld), and subject to stress by university course requirements of enforced experimental participation, or not.

The third line of post-Schachterian research has dealt with the non-anxiety correlates of dependence and their relationships with ordinal position. As these studies are of particular relevance to the present study, and because they are also influenced by research into some aspects of conformity behaviour, they will be dealt with separately in Chapter Three.

The experimental results of this third major line

of development in birth-order research, with their genesis in Schachter's 1959 study, have been treated in some detail. While the conflicting results may cause considerable disquiet, there has been no instance of unequivocal disconfirmation. Rather the later critics, while applauding Schachter's rigour and experimental ingenuity (c.f. Veroff 1960), have confined their objections to a "Yes, but this is only part of the story" criticisms. No major polemics have developed to date. No methodological "cannon" of the type Chapanis and Chapanis (1964) fired at dissonance experimentalits has disturbed the research quiet of work into ordinal position. Indeed, to date, the most serious criticism has been of the disproportionate number of studies which have used solely female student subjects. From the work which has followed Schachter's publication it appears that affiliative behaviour is related to ordinal position among female subjects but that the position is unclear for male subjects. Furthermore, stress, which approximates a fear of physical stimuli and which Schachter terms "anxiety" generally increases the affiliative response for first borns more so than later

borns. Finally, there is no conclusive evidence to suggest that first borns are disproportionately represented among experimental volunteers.

Summary:

Studies of birth-order which have developed along three major lines are reviewed. From research which has related personality traits to specific ordinal positions, much that is conflicting and little that is of marked psychological significance, has emerged. With regard to the present study, three factors worthy of consideration are mentioned, namely the effects of family size as a contextual variable, the differential effects of ordinal position for different age groups and the possible influence of cultural factors. Studies which evolve along a second line of development suggest that the major causal factor in possible birth-order differences is the socialization process. Particularly important is the parents' influence in this regard, but other familial variables warrant examination. Theories which account for the socialization influence by way of role assimilation and reinforcement are discussed briefly. The third group of studies develop sequentially from Schachter's "Psychology of Affiliation" which presents well documented evidence for a birth-order - affiliation relationship as a specific instance of a generalized ordinal position - dependence link. The review

shows that this development has produced a desirable synthesis of research from experimental and developmental fields. Later research has indicated that the initial propositions remain largely tenable, subject to refinement of the variables involved and some unresolved issues.

CHAPTER 2

A Literature Review of Conformity

One of the most active research areas in the field of social psychology in recent years has been the study of conformity of the individual to the group. Although it is not a new development (Terman 1904), the impetus for investigations in the last decade is due in large measure to the classic studies of Sherif (1935) and Asch (1952).

Conformity Defined:

The term "conformity" has acquired a variety of meanings, some of which are intended to be explanatory while others only descriptive. The second meaning is adopted in this research where conformity describes individual behaviours, which are influenced to become congruent with group behaviours. Thus conformity is seen as a specific instance of social influence and separate from behavioural uniformity of independent responses. This definition postulates a dynamic state which focuses upon the behavioural resultant when an individual faces conflict with group goals or norms.

Some writers, Walker and Heyns (1962), Asch (1952),

Crutchfield (1955) view conformity as the polar position of a continuum with non-conformity or independence. These formulations appear inadequate according to Krech et al. (1962), Willis and Hollander (1964) and Allen (1965) who postulate a two-dimensional formulation, with the opposite of conformity viewed as consisting of two conceptually distinct forms of behaviour - "independence" or "anticonformity" ("counter conformity" - Krech et al.). This gives the two dimensions, - conformity - anti-conformity and conformity - independence. This suggests that both conformers and anticonformers are similar, in the sense that both act, to an extreme degree, from cognizance of the group norm, but the directions of action are opposite, although intensities may be the same, whereas the independent accords the norm little weight in his response. It should be stressed that the theorists do not regard the typology as categorizing individuals; rather it is a differentiation of responses. Willis (1963) presents experimental evidence for the distinction.

There now exists a vast and almost formidable

literature of experimental studies of conformity behaviour. Studies have tended to fall into three categories. Many investigators have examined the effects of situational variables of an asocial nature; others have focussed on situational variables of a social type; a third group have investigated the significance of individual differences in the conformity situation. Several adequate reviews of conformity behaviour exist, among them Graham (1962), Berg and Bass (Editors) (1961), Krech Crutchfield and Ballachey (1962) and Allen (1965). The literature reviewed in this chapter will cover studies in the general field of conformity which appear to have some relevance for the current research, while Chapter Three will examine in more detail those studies which have attempted to relate birth-order to conformity behaviours.

Conformity Reviewed:

a. Asocial Situational Variables:

Many studies have focussed on the comparative ambiguity of stimulus materials and its relation to conformity. Typically, three approaches (or combinations thereof) have been adopted (Allen 1965):

(i) Autokinetic phenomenon. (Sherif 1935, Bovard 1948, Rohrer et al. 1954) where the task is extremely ambiguous with no social interaction among subjects.

(ii) Opinion tasks. (Festinger et al. 1952, 1957, Gerard 1954, Raven 1959). The task has no objectively correct answer although it is not completely ambiguous, and where some interaction occurs between subjects.

(iii) Perceptual task. (Asch 1952, Luchins and Luchins 1955a). The task is simple and unambiguous. There is face to face contact, but no interaction among subjects.

Studies which have examined the ambiguity of stimulus material suggested that conformity increases with the degree of ambiguity. Luchins and Luchins (1955b) found this effect, in conformity to misleading suggestions relating to pictures of varying ambiguity. Similar results were reported by Walker and Heyns (1962) Crutchfield (1955) Wiener (1958) and Wiener et al. (1957). The last study

did draw attention to conflicting results from earlier studies which confounded stimulus ambiguity with response uncertainty. Both, distinct concepts, were found to be related to conformity on judgements involving choosing the most suitable name for pictures. Support is offered by Kelley and Lamb (1957), in a taste experiment involving phenylthioures, on groups of tasters and non-tasters. A taster majority affected the non-taster but a non-taster majority did not influence the sole taster. Certainty of judgements was shown to be a variable; ratings of tasters indicated more certainty than ratings of non-tasters. Finally, in a later study Luchins and Luchins (1963) suggested that the relationship of task ambiguity to conformity was subject to some reservation. Where the judgement objects play a peripheral role in the judges cognitive grasp of the situation, task ambiguity may not be as strong a determinant of conformity as the social factors.

Studies indicate that as the difficulty of a task increases so too does the conformity behaviour. This effect has been found by Crutchfield (1955) using perceptual, word comparisons and number series, Blake et al. (1957)

using a variety of cognitive problems, and London and Lim (1963), using syllogisms of increasing difficulty. Mouton et al. (1956) did not find increased conformity to group norms as the rate of metronome clicks to be counted increased, a negative result. Other studies have increased the difficulty of a task by decreasing the information presented to a subject. This has been shown (Walker & Hoyns 1962, Snyder et al. 1960) to increase conformity.

Some research indicates that the size of the discrepancy between the individual's judgement and the group norm is critical. Hovland et al. (1957a,b) indicated that there may be limits to the extent to which movement varies with distance from the norm and that the movement may involve assimilation or contrast effects. Fisher and Lubin (1958) showed that movement toward the norm increased with distance, but there were indications that movement decreased with greater distance. Olmstead and Blake (1954), using an estimation of the number of clicks heard, found that conformity was greatest when the "majority choice" was a one click error, least when the

error was two clicks, and fell between, when the error was three clicks. (They explain this latter result by reasoning that the subjects simply endeavour to avoid being different and don't bother to count clicks in the 3 click-error situation). Schroder and Hunt (1958) failed to find this inverted U shaped distribution in their study but Blake, Nelson and Mouton (1957) Tuddenham (1961) Johnson (1964) and Whittaker (1964) did.

To summarize then, it appears that conformity is related to some asocial situational variables. Most studies suggest that conformity behaviour increases as a function of the ambiguity of the stimulus material, the subjective uncertainty of the individual, and the difficulty of the task, but that the relationship of this behaviour to the individual - group norm discrepancy is characterised by an inverted U function. Some negative results are noted, Luchins and Luchins (1963) Mouton et al. (1956) and Schroder and Hunt (1958).

b. Social Situational Variables:

Conformity behaviour has been related to many social situational variables, some of which are relevant

to the current research. In considering the influence of these social variables upon conformity, attention must be paid to the distinction suggested by Deutsch and Gerard (1955). They identify two functions of group norms in terms of different types of social influence.

(1) Normative - conformity to the group because of positive expectations of the group.

(2) Informational - conforming to the group because its behaviour is taken as a cue to reality.

They consider that most conformity studies focus upon the latter and only incidentally on the former. Allen (1965) concedes the point as most studies involve subject-group relationships without common expectations or norms, but adds a rider to the effect that in many situations both kinds of influence operate and it is not always easy to separate them, a statement with which Graham (1962) would agree. Both such pressures operate in a social situation, as Campbell (1961) has suggested, but it is doubtful whether any research has or will manipulate these variables with empirical purity, although some (Becker, Lerner and

Carroll 1964, 1966) have claimed to do so. Allen (1965) suggests that DiVesta (1959) most closely approximated a pure informational situation when, in his experiment on the Crutchfield apparatus, lights displayed incorrect responses which the subject had been explicitly told did not represent other subjects' responses.

Similar formulations to that of Deutsch and Gerard have been advanced by Jackson and Saltzstein's (1958) "normative" and "modal" situations and Wilson's (1960) processes of "social accommodation" and "self correction".

Much research has concentrated on the effects on conformity behaviour of public as opposed to private judgements. Deutsch and Gerard (1955) found more conformity evidenced in judgements made in a face to face situation than in an alone condition. Asch (1956) found less yielding in private recording conditions than in verbal public responding. Levy (1960), using the Crutchfield type of simulation technique found that this halved conformity behaviour compared with that experienced in face to face groups. Argyle (1957) found more conformity on opinion judgements in a public situation than in a private situation. Olmstead and Blake (1955) found a similar trend,

but the lack of statistical significance, they considered, could be attributed to inadequate independent variable manipulation for the public - private judgement conditions. Allen (1965) notes that the principle appears empirically established, but the reasons for this, are less clear. Perhaps the individual is responding to the increased strength of public compliance or, instead, in public, the group may appear to be more convincing.

Some attention has been given to the source of the influence. Berenda (1950) and Blake and Mouton (1961) both find that greater influence is exerted on children by their peers than by adults in conformity experiments. This tends to offer indirect evidence that the Deutsch and Gerard distinction is meaningful, as in the Berenda experiment the adults were the subjects' teachers. Mausner (1953) found a slight trend in favour of an art authority as opposed to peers in conformity behaviour on the Maier Art test, but Moore (1921) found no differences in "expert" produced conformity as contrasted with peer majority opinion over a number of situations.

Characteristics of the group are shown to be important

by Allen (1965). On the basis of his review of many studies, he notes the fallacy of the experimenter assuming that the subject will conform to the group of which he is operationally a member during the experiment. Certainly some influence may emanate from this possible face to face contact, but other influences may derive from reference groups which are not physically present.

Reinforcement has been studied as a variable in the context of conformity studies. Luchins (1955) and Crutchfield (1955) found that reinforcement of group judgements resulted in marked increases in conformity behaviour. Jones et al. (1958) found that reinforcement of a subject's own judgement was more effective in increasing independence than reinforcement of a contrary judgement in encouraging conformity. Mausner (1954) and Kelman (1950), using Asch and Sherif techniques respectively, showed that reinforcement of solitary judgements increased their resistance to later influence. DiVesta (1959) found that subjects conformed more when they received negative verbal reinforcement, and less when they received positive verbal reinforcement. Goldberg and Lubin (1958) increased conformity to a

partner's responses by informing the subject that he had made increasing numbers of errors. Endler (1966) found that reinforcement for agreeing with a contrived group consensus elicited more conformity than reinforcement for disagreeing, where reinforcement was information on performance by experimenter feedback.

There is evidence from Milgram (1961) that there are some cultural differences in conformity behaviour. In a series of four experiments using an auditory task involving choice between two tones, Milgram found that Norwegian students consistently yielded to pre-recorded "group judgements", more than did French students. This cultural difference held for conditions of simple conformity of public and private judgements, and also in the reactions of the two groups to criticisms of experimental non-conformity. Milgram interprets the differences between the two groups in terms of the varying degrees of cohesion within the two societies.

Some research would indicate that the experimenter himself may influence conformity behaviour and inadvertently or otherwise, contaminate the influence of the independent variable. Endler has shown that verbal stimuli

from the experimenter could affect conformity responses. Luchins (1955) and others have shown a similar finding, and stress that this factor becomes more significant with child subjects. As Graham (1962) suggests, conforming to an adult experimenter may be important to some children. It is conceivable, when students are used as subjects that conforming to experimenter expectations will be a contaminating variable, particularly when experimental participation has some significance for assessment of the student's progress, as Allen (1966) shows.

Various methods of deception are commonly adopted in conformity experiments, particularly with regard to presenting information of a false group consensus. Goldberg and Rorer (1966) found little difference between yielding to correct and incorrect information of consensus, (once the data was corrected for the bias of having more individual responses closer to the correct mean than the incorrect mean). Allen (1966) shows in his study of 150 female students that assumptions or knowledge of experimental deception did not decrease yielding on perception or information items even when the norm was set as high as the

99th percentile. Allen discusses possible reasons for this on an intuitive basis. He suggests the subject may wish to be a "good" subject and not "ruin" the results; the subject may forget that the experiment is rigged; disturbance at appearing different may be greater than the suspicion of the experiment; or the subject may lack confidence in his suspicions.

In summary, it appears that social situational variables can and do influence conformity behaviour, whether they operate by way of normative or informational processes. Research indicates that public judgements result in greater conformity than private, although Allen (1965) notes this is subject to stimuli variations. The source of influence has an effect, and research tends to suggest that for children, the influence of peers is greater than that of adults. Allen concludes on the basis of his review that group characteristics are important, particularly those of reference groups not physically present in the experimental situation. Considerable uniformity of results suggests that reinforcement does influence conformity behaviour, while other research suggests that the experimenter himself and the deception he uses may be variables which can contaminate results.

c. Individual Differences in Conformity:

Considerable research interest has been evinced in the relationships of various personality variables to conformity, based largely on the view that conformity behaviours show high individual consistency.

Asch (1956) reports that his subjects show a considerable degree of consistency. Blake et al. (1956) found a high degree of individual consistency within tasks and also between three conformity tasks - perceptual, opinion and problem types. Nakamura (1958) found the consistency of conformity on perceptual items to be high (.87 men, .80 women), but the reliability for attitude items was very low. Tuddenham (1958) found that the consistency in conformity behaviour was high for extreme subjects but lower for those in the middle region of the distribution. Wiener et al. (1957) also reported inter-task consistency of conformity behaviour. However Linton (1955) found no inter-correlations between conformity tasks such as the autokinetic situation, syllogisms and attitude change tests. Goldberg (1954) argues against any "general personality characteristic of suggestibility or conformity", on the basis of his research using picture

stimuli. He found that susceptibility to influence was highly specific to each picture.

Vaughan (1964) has suggested that the tendency to conform can be meaningfully described as a trait, which is probably normally distributed in a population. He suggests that trans-situational consistency in conformity behaviour is characteristic of the extreme groups in the distribution, but that situational variability plays an increasingly important role as the centre of the distribution is reached. Vaughan offers very limited experimental support, but his theoretical notions do fit Tuddenham's (1958) data.

Studies have been recorded which attempt to link conformity behaviour to various personality constructs or traits, operationally defined by a given test, inventory or scale.

Moeller and Applezweig (1957) found conformity in the Asch type situation linked to a high need for social approval and a low need for self approval as measured on the Behaviour Interpretation Inventory, a finding which was confirmed for self approval by Schroder and Hunt (1958), and by Crowne and Marlowe (1964) using approval as

measured on the Marlowe-Crowne Social Desirability Scale. Mussen and Kagen (1958), using an Asch situation, and the T.A.T., with college students, found that more extreme conformers than independents viewed their parents as harsh and rejecting. Krebs (1958) found that subjects high on need-Achievement (Murray 1953) were more likely to be independent in a memory task involving a choice between two slides which contained particular objects. Samelson (1957) using the same personality measure found that high n'Ach. subjects were more resistent to experimenter instructions. However, Hoffman (1953) had found the opposite relationship to Krebs, when he discovered that conformers were more highly motivated to succeed than nonconformers, in an Asch situation. It is conceivable that those highly motivated to achieve make a cognitive choice to conform, in the expectation that this may increase the probability of successful responses. Barron (1952) related performance in an Asch type situation to scores on the Gough Adjective Check List, and found significant differences between yielders and independents in self-reported characteristics. He summarizes a lengthy list of

differences by suggesting yielders see themselves as more practical minded, while independents have a self image of creativity, sociability, and a valuing of individuality.

Levine et al. (1954) in a study comparing non-psychotic psychiatric patients with general medical patients found that the former group conformed less in an autokinetic situation. However the sample was small (N = 17). Crutchfield (1955) found that conformers tend to be more anxious and exhibit signs of distrust and dejection but he does not generalize to a general conformity - neuroticism relationship. Crutchfield (1955) and Barron (1952) found that conformity was unrelated to scores on the M.M.P.I. although Young and Gaier (1953) did find that scales from the M.M.P.I. and Bernreuter Inventory did distinguish conformers from non-conformers. Kelman (1950) was able to relate conformity in the autokinetic situation to scores on Guilford's GAMIN Inventory, finding that ascendancy, self confidence and lack of nervous tension were negatively related to suggestibility. But where subjects had had their own responses reinforced in a pre-test, the above relationships were positive. Linton

(1954) also used the autokinetic situation and related performance to certain Rorschach signs considered to be indicative of e.g. confidence and self acceptance, with mixed results.

Many studies have examined the relationship between conformity behaviour and measured intelligence. Most studies, Crutchfield (1955) and Nakamura (1958) using the Concept Mastery Test, and Tuddenham (1959) using the Terman Group Test, suggest that the more intelligent a person is the less he will conform. The finding appears to hold for males but is less pronounced, although in the predicted direction, for female subjects. Negative results were reported by Janis et al. (1959) who showed that in some situations, the relationship between conformity and intelligence is positive. This finding appears plausible in terms of the Deutsch and Gerard (1955) dichotomy. When informational pressures are salient and the information appears to possess considerable face validity, such a relationship could be expected. Negative results were also obtained by Carment Schwartz and Miles (1963) but the finding is subject to interpretive ambiguities.

Included for convenience, within this sub-section of individual differences, is a consideration of the literature of sex differences in conformity. The generalized finding involving a variety of experimental conformity situations, is that women exhibit more pronounced conformity behaviour than men, (Crutchfield 1955, Tuddenham 1958, Applezweig and Moeller 1958, Beloff 1958, Krech Crutchfield and Ballachey 1962, Iscoe Williams and Harvey 1963, Reitan and Shaw 1964, and Endler 1966). Blake and Mouton (1961) agree with the above findings but suggest that the differences are "not of an extreme character." Only Phelps and Meyer (1966) report "no differences" in their conformity study using a Crutchfield apparatus. Tuddenham, MacBride and Zahn (1958) and Luchins and Luchins (1955a) show that subjects conform more to an opposite sex confederate than one of the same sex. In each case the sex differences are interpreted in relation to cultural expectancy.

To summarize, it appears that conformity behaviour does exhibit some degree of individual consistency, within and between tasks, although there appear to be some tasks, e.g. opinion items which are less predictable in their

consistency of eliciting conformity behaviour. Possible differential effects between extreme and moderate groups are suggested. Studies have given a "mixed bag of results" in attempting to relate conformity behaviours to personality traits, and to date no meaningful synthesis has emerged. The relationship between conformity behaviour and intelligence is unclear and appears to be mediated by task and sex variables. The literature suggests that males tend to conform less than female subjects, but the differences are not likely to be very great.

Summary:

The literature on aspects of conformity behaviour which relate to the present study, are reviewed. Conformity is defined in terms of multi-dimensional models (Allen 1965, Willis and Hollander 1964, Krech et al. 1962). The categories of conformity studies are reviewed. Studies which examine asocial situational variables suggest that conformity behaviour increases as a function of the ambiguity of the stimulus material, subjective uncertainty of the individual and the difficulty of the task, but that the relationship to the individual - group norm discrepancy is characterised by an inverted U function. Research which focusses upon social situational variables, suggests conformity behaviour is influenced by the comparative privacy of the judgement situation, the source of the influence, the reinforcement schedule which is adopted and by experimenter-subject interaction. Finally the literature which includes the relationship of individual differences to conformity is reviewed. The only clear cut relationship to emerge is that female subjects conform more than do males. Some theoretical and empirical consideration is given to the question of individual consistency within and between conformity tasks.

CHAPTER 3

A Literature Review of Studies in Birth-Order and Conformity.

The previous chapters have presented a review of literature in the fields of birth-order and conformity behaviour. This present chapter is in the nature of a synthesis, linking the research on birth-order to conformity, by examining studies which have probed relationships between these two variables. These studies are summarized in Table One.

Schachter (1959) had presented evidence which suggested that the empirically observed links between birth-order, anxiety and affiliation were specific instances of a generalized birth-order - dependency relationship, with first borns being more dependent than later borns when anxiety was held constant. He cited support from the works of Haeberle (1958) Gewirtz (1948) Beller (1948) and Sears (1950) as evidence of the ordinal position - dependency relationship, and suggested that the phenomenon was a function of child rearing practices and the differential consequences of sibling relationships for first and later borns. Having suggested that other behaviours, which are

Gewirtz (1948) & Beller (1948)	3 & 4 yr. old children (N=42)	M.&. F.	Birth Order (F.B. v L.B.)	Observations under standardized conditions. Ratings on various types of dependency behaviour.	First borns showed more dependency behaviour than later borns.	N.S. but consistent trends.
Dean (1947)	Children in 2 sibling family (N=40)	M.&. F.	Birth Order (F.B. v 2nd Born)	Paired comparison ratings of personality characteristics by mothers of two siblings.	First borns rated more dependent than later borns.	
Haeberle (1957)	3-6 yr. old mildly disturbed children (N=63)	M.&. F.	Birth Order (and non relevant variables) (Only v F.B. v L.B.)	Summated rating from scores on 5 measures of dependency behaviour, after Beller (1957) e.g. attention seeking, contact.	1. Boys and girls. Only more dependent than first borns who were more dependent than later borns. 2. No indication of family size as a variable (N.B. N = 63)	$.05 \geq p \geq .02$
Ehrlich (1958)	Students (N=130)	M	Birth Order (and non relevant variables (F.B. v L.B.)	Change in choice of one of seven outcomes to a case study following information on group "consensus".	More first borns than later borns were influenced by the group norm.	$p = .06$
Staples & Walters (1961)	Students (N=64)	F	1.Birth Order (F.B. v L.B.) 2.Anxiety v Non Anxiety (Shock v non Shock)	Conformity in autokinetic situation	1. First borns are more responsive to suggestions of others, than later borns. 2. First born are more responsive under conditions of threat, than under non-threatening conditions.	$p < .06$ $p \geq .05$
Walters & Ray (1960)	1st & 2nd grade children (N=40)	M	1.Birth Order (F.B. v L.B.) 2.Anxiety v Non Anxiety (Introduction of a stranger)	Rate of conditioning to a social reinforcer - approval.	1. No difference between first and later born in rate of conditioning. 2. Anxiety increased rate of conditioning for both groups	- $p = < .005$
Dittes (1961)	Students	M	1.Birth Order (F.B. v L.B.) 2.Evaluation (false) by peers.	Evaluation of a group which had supposedly evaluated the subject.	1. First borns' behaviour varied according to perceived regard they felt othershad for them. 2. Later borns were unaffected.	-
Glass et al. (1963)	Students (N=108)	M	1.Birth Order (F.B. v L.B.) 2. Frustration.	Behavioural reactions to an experimental accomplice who was a frustrating agent.	Later borns reacted with greater annoyance to frustrating agents than did first borns.	No sig. for general conclusion.
Sampson (1962)	1.Students (N=88)	F	1.Birth Order (F.B. v L.B.) 2.Conformity.	1. Influence of experimenter accomplice upon attitudes to issue.	1. First born greater resistance to influence than later borns.	$p = .10$
	2.Coast Guard Recruits (N=116)	M	1.Birth Order (F.B. v L.B.) 2.Conformity	2. Scores on simple performance task under leader influence. (Reward and fine conditions)	1. First borns tend to be more conforming than later borns in reward situation.	$p = .06$
	3.Students (N=61)	M.&. F.	1.Birth Order (F.B. v L.B.) 2.N.Achievement (French test of Insight)	3. Scores on a digit symbol task.	1. Significant tendency for male and female subjects who are first borns to have higher n'Ach. scores than later borns.	$p = .05$
Gilmore & Zigler (1964)	Children (N=40)	F.&. M.	1.Birth Order (F.B. v L.B.) 2.Social support v no support.	Period of playing simple game under the two support conditions.	1. First borns played simple satiation game for shorter period than later borns under social support. 2. First borns played the game longer under no support than under conditions of social support. This was reversed for later borns.	$p = .005$ $p = .05$
Smith & Goodchilds (1963)	Firemen (N=165)	M	Birth Order (F.B. v L.B.)	1. Changes in scores before and after discussion on "desert island task" and "horse trading problem". 2. Scores on K scale of M.M.P.I.	1. First borns conformed more than later borns when discussion group was large. 2. When the group was small, the trend held. 3. First borns were lower on self confidence as measured by K scale of the M.M.P.I.	$p = .05$ N.S. $p = < .05$
Arrowood & Amaroso (1965)	Students (N=92)	F	1.Birth Order (F.B. v L.B.) 2. Manipulated belief that the subjects opinions conformed or deviated from the group, on chosen alternative, as solution to delinquency case study.	1. Acceptance or rejection of deviates (Sociometric). 2. Change in opinion vis-a-vis the group norm.	1. First borns who believe themselves to be conformers reject a deviate more than do similar later borns. 2. First born deviates exhibited more conformity behaviour than later born deviates. 3. First borns less confident than later borns on initial choice.	 $p = .048$ $p = .01$
Carrigan & Julian (1966)	6th Grade Children (N=96)	M.&. F.	1. Sex 2. Birth Order (Only v F.B. v L.B.) 3. Affiliation arousal by having subjects rate peers on sociometric choice.	Conformity as measured by change of choice of story description of pictures after information on popularity of choices.	1. First borns and only children are more influencible than later borns. 2. Females more influencible than males. 3. Differences increased under heightened affiliative arousal.	$p < .01$ $p < .01$ $p < .01$
Becker & Carroll (1962)	U.S.born & Puerto Rican boys (N=48)	M	1. Birth Order (F.B. v L.B.) 2. Reference group membership.	Asch situation.	1. First borns yielded more than later borns. 2. Puerto Ricans yielded more than Americans. 3. No birth order differences within the Puerto Rican group.	$p < .01$ $p < .01$
Becker Lerner & Carroll (1964)	15-16 yr. old golf caddies (N=36)	M	1. Birth Order (F.B. v L.B.) 2. Reward conditions. 0. ¢ - None 5 ¢ - Low 25 ¢ - High (Claim informational - normative distinction as in text).	Asch situation. (Number of conforming errors).	1. First borns made more conforming errors in the no reward ("normative") situation than later borns. 2. Later borns made more conforming errors in the high reward (informational) situation than first borns).	(Not given) $p = < .01$
Becker Lerner & Carroll (1966)	High school volunteers. (N=48)	M	1. Birth Order 2. Group Pressure - a. Group reward = "normative" b. Memory = "informational" c. Control = standard Asch situation.	Asch situation.	1. In control condition, first borns yielded more than later borns. 2. In group condition first borns increased yielding over control first borns. Later borns increased more than later borns in control, but not significantly. 3. In memory condition later borns yielded more than other later born groups.	 $p < .06$ $p > .41$

related to dependence, would show the same ordinal effect, Schachter turned to Ehrlich (1958) for confirmation. This study had found first borns to be more influencible than later borns, but only after straining for statistical significance ($p = .06$). None the less, Schachter suggested that it could be anticipated that other dependency linked behaviours would eventually prove to be related to ordinal position.

To some degree, Schachter's anticipation has been confirmed, as a series of studies since 1959, has probed the relationship, but with the distressing research consequence of conflicting ordinal results. These studies have focussed in some cases specifically on conformity, or in a more generalized fashion, upon some operational index of vulnerability to, or influence by, social pressure.

Staples and Walters (1961) experimented with thirty-two first born and thirty-two later born female undergraduates in an autokinetic situation. First born subjects responded more quickly than later born subjects to the suggestion that the light would move. In addition, first born subjects under an anxiety arousing condition,

namely the anticipation of an electric shock for incorrect responses, were more suggestible than were first borns under the non-anxiety condition, whereas later borns seemed unaffected by the anxiety condition. This seemed to offer substantial support for Schachter's (1959) theory. However, this theory would predict that first born subjects under non-anxiety conditions should be more suggestible than later born subjects under similar conditions. The results indicated no difference between the two groups on non-anxiety post suggestion trials.

Contrasting results were found in a concurrent study, Walters and Ray (1960). They challenged the view that first borns are more susceptible to social pressure than later borns. The investigators suggested that if first borns are more responsive to social pressure, they should respond more strongly to verbal expressions of approval. In an experiment on forty first and second grade boys involving a verbal conditioning procedure, they found no birth-order effects. Performance on a task after verbal approval did not increase differentially with respect to birth-order. Inducing a state of mild anxiety, by introducing a stranger, increased levels of performance on the

task under conditions of verbal reinforcement, again regardless of birth-order. The authors note their findings conflict with results from Schachter et al. (1959) and Staples and Walters (1961) and interpret this as resulting from sex differences in the subjects used.

Some support for the Walters and Ray finding is offered by Gilmore and Zigler (1964) who found that first born children played simple games for shorter periods than later borns under conditions of social support ($p = .005$). They attribute this result to the assumption that first borns are more satiated on social reinforcers than later borns and are therefore less likely to be motivated by social reinforcement.

Dittes (1961) found that the behaviour of first borns varied according to the regard they felt others had for them, while later borns seemed resistant to this influence. Glass et al. (1963) contradicted Dittes' finding in a re-analysis of their experiment on frustration and aggression on 108 male undergraduates. They showed that later borns reacted with greater annoyance to frustrating agents, (experimenter accomplices, who denied information to the subjects), than did first borns. This inconsistency with

Dittes parallels conflicting birth-order findings from Gerard and Rabbie (1961) and Sarnoff and Zimbardo (1961). Glass et al. suggests the differences are explainable in terms of socio-cultural differences in subject groups.

Sampson (1962) conducted three separate studies using three separate samples of subjects in his study of birth-order, need for achievement, and conformity. Like Staples and Walters, Sampson classified his subjects as first and later born. Conformity was tested in two situations, one where a hired assistant played the role of a debater and sought to influence an attitude, while the other involved a simple motor task with changing rates of performance suggested by an experimenter. From the three studies, Sampson concluded that first born subjects have a higher need for achievement than later borns; that first born females conform less than do later born females; and that first born males conform more than later born males. The second and third results are interesting, in that they show a sex reversal effect and also conflict with Schachter's results if one recalls that his subjects were all females. However, there is

agreement with Ehrlich (1958) who used male subjects. Sampson attempts to explain the results by suggesting an alternative to Schachter's theorizing with regard to early child rearing practices. Briefly it is suggested that the first born female is often involved in the training of later born siblings (Koch 1955) and this gives more independence training than is experienced by the first born male. This leads to higher achievement motivation, which Sampson claims has been shown (Krebs (1958) et al.), and eventually to a greater resistance to conformity. Furthermore Sampson suggests that the timing of independence training differs for males and females. The independence training for females, being domestically oriented, is earlier than is that for males, which is more typically occupationally oriented. Such assumptions are interesting but, like most post-hoc theorizing, lacking in empirical support. Furthermore, Sampson's results are subject to interpretation ambiguities. Thus nonconformist behaviour to a presumed expert on a given topic could be interpreted as conforming behaviour to the subject's own group. It appears to this reviewer, that Sampson could

well have adopted an experimental procedure which was uniform across research conditions to lessen interpretive ambiguity.

Smith and Goodchilds (1963) departed from the undergraduate female Schachterian subject, and attempted to relate behavioural and personality variables to birth-order on 165 firemen. In a hypothesis derived from Schachter's (1959) findings, they suggested that first borns would score more highly than later borns on conformity within their group. They analysed scores, before and after discussion, on a "desert island" task, and "horse trading" problem[1] for first and later borns, and found that when the discussion group was large the first borns conformed more than did later borns ($p < .05$) but when the discussion group was small, the trend held but was not significant. They also offered support for the dependency hypothesis (Schachter 1959 Sears 1950) by finding that first borns were lower on self confidence as measured by the K scale of the M.M.P.I.

Arrowood and Amoroso (1965) examined Schachter's dependence - birth-order finding by hypothesizing that when

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[1] The desert island task involved the supposed choice of three items to be shipwrecked with, and the horse trading problem was an arithmetic calculation of a party game type.

first borns believe themselves to be conformers in a group they reject a deviate more readily than do later born conformers; and when first borns believe themselves to be deviates in a group, they tend more readily than do later born deviates to change their opinions toward the modal opinion of the group. The two hypotheses were tested on ninety-two female undergraduates, half of whom were first born and half later born, split into groups of four to six. The subjects, after privately choosing one of seven alternative proposals for rehabilitation relating to a delinquency case study, were then given fictitious information concerning the distribution of opinions within the group in which a high degree of cohesiveness had been experimentally induced. Half were led to believe they conformed and half that they deviated from the group norm. Following a fifteen minute discussion, the subjects repeated the proposal choice, and this allowed the experimenters to derive a measure of change of opinion. Strong support was obtained for the two hypotheses. First born conformers did reject an opinion deviate more readily (as measured by sociometric choice) than did later

born conformers. First born deviates exhibited more conformity behaviour than did later born deviates. The authors suggest that the study offers considerable support for Schachter's (1959) theory, particularly relating to his notions of differential dependence and birth-order.

Carrigan and Julian (1966) conducted a study of birth-order and sex differences in conformity behaviour, on ninety-six sixth grade children. The conformity task consisted of selecting the most appropriate story description for a set of pictures, informing subjects of previous popular choices and asking the subject to repeat the choice. Carrigan and Julian found that first borns and only children were more influencible than later born, and that female subjects were more influencible than male. These differences increased under conditions of social threat, as would be predicted by Schachter (1959).

Continuity in the study of the relationships between birth-order and conformity behaviour, has been achieved in small measure by the studies of Becker et al. (1962, 1964 1966). Their research has been closely linked to the Deutsch and Gerard (1955) distinction between normative and informational social influence, with varying degrees of

experimental success.

Becker and Carroll (1962) adopted an Asch situation as maximizing susceptibility to normative social influence. (This writer cannot support the Becker and Carroll interpretation as it is more than conceivable that subjects in the situation are also attending to supposed informational cues. The distress of some subjects, which is evident from introspection and retrospection comments made, would support the contention. It appears that the authors are regarding normative and informational influence as operationally distinct. It is doubtful if Deutsch and Gerard (1955) were as optimistic).

Forty-eight boys, thirty native born Americans and eighteen Puerto Rican, served as naive subjects to three American born sophisticated subjects, in the Asch situation. The experimenters found that first borns yielded more than did later borns ($p < .01$). It was also found, as hypothesized that Puerto Ricans yielded more than Americans ($p < .01$). The rationale underlying this hypothesis was that individuals striving for membership in a group, will be more susceptible to social influence than those who are already members of the group. However, in

comparing the birth-order and national groups, it was found that first borns and later borns in the Puerto Rican group did not differ significantly on yielding. This is not surprising in terms of Schachter's assumptions concerning the antecedents of birth-order effects. It is quite possible, indeed probable, that cultural differences are likely with regard to child-rearing practices, and if Schachter's theorizing is tenable, then ordinal effects will show cultural divergences.

The following study in the series, Becker Lerner and Carroll (1964), again rests on a controversial rationale and is subject to interpretive ambiguities. Becker et al. accept the Schachterian viewpoint with regard to the first born child. They extend his views on the effect of siblings upon the second born by quoting from Adler (Ansbacher and Ansbacher 1956)

> "... if the oldest is not fighting against him (the later born child) and pushing him back, he is very well situated. Throughout his childhood he has a pacemaker." (P.379).

The younger child has a relative peer as a model and a

source of information which the earlier child lacks. Becker et al. consider this to be a valid analysis and reason that ordinal differences in conformity can be expected as a result:-

a. First borns, being more dependent upon others for emotional support will be more amenable to "normative" influence.

b. Later borns, will be more susceptible to social influence which is largely "informational" in content.

This writer considers the rationale to be inadequate and naive. Firstly it assumes that the first born will have no access to an unrelated peer who may act as an information source. Secondly it ignores the high information content in the parents' role relationship with the child - first or later born. Thirdly, it rests on a questionable assumption that extra-laboratory social influence can be meaningfully dichotomized into these two forms. Finally it can be argued that non-normative social influence is virtually a contradiction in terms.

Becker et al. adopted an Asch technique, modified by

a Krech et al. (1962) payoff schedule on fifteen and sixteen year old golf caddies, to test a series of hypotheses which may be generalized as follows. First borns will be more susceptible to normative pressure and later borns will be more susceptible to informational pressure. The subjects were divided into three groups: control in which no reward was given for a correct response; low reward (5 cents); and high reward (25 cents). The no reward situation was considered normative as little information was conveyed. The high reward condition was considered informative since the subject would assume the other subjects were risking something of value and therefore their judgements should be considered. That is - the information value was manipulated at three levels, while the normative value, though constant, varied in comparative salience. Becker et al. support this variable manipulation by analogy with "bluff" in poker. If one player bets highly he apparently holds cards of value. (One wonders which is greater - the experimenters' naivety in poker or experimental manipulation!)

Becker et al. claim that the results were as hypothesized. First borns did make more conforming errors

in the no reward situation than later borns. Later borns made more errors in the high reward situation than first borns. The study does aot explain why first borns made more errors in the no reward condition than in both reward conditions. Nothing in Becker et al.'s theorizing would predict a decrease in conforming behaviour when the "normative" content remained constant. Furthermore, the later borns' conformity relationship with increased informational pressure is not a simple linear function as Becker et al. imply but approximates a U function.

Such was the scope of the birth-order conformity literature when the current study was undertaken. Recently, a further study by Becker Lerner and Carroll (1966) re-examines the 1964 experiment in the light of some criticisms which were made at the time with regard to subject bias and independent variable manipulation.

This 1966 study acknowledged that the earlier experiment, using subjects who were golf caddies from the same country club, was of limited generality. In this later study they again used an Asch situation this time on 48 male volunteer high school subjects, twenty-three

of whom were first born and twenty-five later born. The subjects were divided into three groups.

a. Control - the standard Asch judgement situation with three accomplices.

b. Memory Condition - the stimuli (lines) were removed before the subject responded, this being the "informational" condition.

c. Group Reward - the subjects were told that the group which made the fewest errors would be rewarded.

The experimental results were as predicted. In the control condition, first borns yielded more than later borns. In a group reward condition first borns increased yielding over first borns in the control condition ($p = < .06$) whereas later borns increase was "not comparable" ($p = > .41$). In the memory condition, later born subjects yielded more than in either of the other two conditions whereas first borns were unaffected.

In their interpretation the authors make a between-groups comparison for which no results are presented. e.g. the comparison of first born and later born in the group

reward condition does not quite reach the .05 level of significance on a Mann Whitney U test (Siegel 1956), applied by this writer ($p = .052$ where $n = 7, \& 9$). Most of the significance levels which are quoted are marginal and this together with the interpretive ambiguities suggest a verdict of "Not Proven".

Many of the studies reviewed in this chapter have been conducted on comparatively few subjects, as is shown in Table One. This is particularly true of the Becker et al. (1962, 1964, 1966) studies where the N's = 48, 36 and 48 respectively giving within group n's of six to nine.

A synthesis of the literature on birth-order in its relation to conformity, would suggest that some room for doubt still exists in the generalized contention that first borns exhibit more conformity behaviour than later borns. Of the eighteen studies reviewed, Sears (1950), Gewirtz (1948), Beller (1948), Dean (1947), Haeberle (1957), Ehrlich (1958), Dittes (1961), Ehrlich (1958), Smith and Goodchilds (1963), Arrowood and Amaroso (1965), Carrigan and Julian (1966), and Becker et al. (1962, 1964, 1966) offer support for Schachter's

hypothesis. However nearly all are open to criticisms of either subject bias by sex or social class, or interpretive ambiguities in attempts to refine birth-order effects. Staples and Walters (1961) and Sampson (1962) offer partial support, while disconfirmatory evidence is suggested by Glass et al. (1963) Walters and Ray (1961) and Gilmore and Zigler (1964). Still unresolved is the influence of the sex of the subjects, the influence of family size as a variable, the validity of the application of the Deutsch and Gerard distinction in experimental conformity behaviour, and the degree to which the ordinal position - dependency linked behaviours relationship may be generalized. The current study was undertaken in part to reconcile some of these difficulties.

Summary

Studies which have examined Schachter's assumption that dependency-linked behaviours would prove to be related to ordinal position, are reviewed. On the basis of the research evidence to date, it appears that first born subjects do tend to exhibit more conformity behaviour and show greater susceptibility to social influence than later born subjects. However, this finding is subject to interpretive difficulties due to sex bias in the subject samples used. Studies which attempt to distinguish normative and informational conformity - birth-order relationships are reviewed. While the experimental manipulations have been shown to have had some effect, the interpretation of what has been manipulated is held to be open to question.

CHAPTER 4

A Literature Review of Family Size as a Variable

In the course of discussions which preceded this research, on ordinal position as an experimental variable, it was suggested (Gregson 1966) that family size was a contextual variable which was frequently ignored in studies of birth-order factors. This viewpoint appears to have been shared by other theorists e.g. Rosen (1961) Rosenberg and Sutton-Smith (1964). For this reason it was decided to include family size as a major variable in the current research.

The research literature on family size is very limited, compared with that of the other major ecological variable in the present study, birth-order.

The major research in this field has been carried out by Bossard et al. (1952, 1955, 1960). Bossard and Sanger (1952) found that large families (six or more siblings) appeared to foster more differing personalities in children than did smaller families. They noted that group, rather than individual needs were fostered, more internal organization developed, and a sibling power structure emerged in large families. Bossard and Boll

(1955, 1960) showed that specialization of roles occurred and they were able to identify eight major role types following data collection by questionnaire, interview and family history forms.

Stagner and Katzoff (1936) had also found that personality differences could be a function of family size. In a study using the Bernreuter Personality Inventory they found "a slight advantage for small families, that is, they are less neurotic, more self sufficient and more dominant."

The major research topic to which family size has been linked as a variable is scholastic achievement. Among these studies, there appears to be fairly consistent agreement. Griffitts (1926) found that the average grades of children showed a trend to decrease as the size of the family increased, and this finding was confirmed by Buesman (1928, 1930). Jenkins and Randall (1948) compared superior Negro students who were in the upper four or five percent of 5578 students in segregated colleges, on the American Council on Education Psychological Examination and General Culture Test, with the undifferentiated total group. They found that the median

subject of the superior group had 2.2 siblings while the median subject of the total group had 3.7 siblings. This finding is attentuated however by social class differences between the superior and unselected groups. High achievement in the superior group was also associated with higher socio-economic class. Smaller family size was also typical of this group, but there may be no causal relationship between achievement and family size per se. This interpretive distinction is not discussed in Jenkins and Randall's study. Damrin (1949) found that children from small families (< 4 sibs.) were generally superior in intelligence, as measured by the Terman McNemar Test, and school achievement, although the differences are not statistically significant. Fraser (1958) also found a negative correlation between the size of the family and the academic achievement of students. Rosen (1961) found that there was a tendency for children from small families to have higher achievement motivation than children from larger families, with motivation to achieve measured by T.A.T. techniques. Chopra (1966) offers cross-cultural support for the

generalized trend, in his study of 1359 randomly selected male high school students in India. He found a gradual decline in mean intelligence test scores on the Ravens P.M. Test, and mean high school marks as the size of the family increased. These differences were statistically significant, and this was maintained for school achievement when intelligence was held constant through analysis of covariance. It is quite possible that Chopra's study offers only limited cross-cultural support, as his subjects, being selected from predominantly urban high schools in the Lucknow district, could be expected to be more Westernised than an unbiased sample of Indian students. Furthermore the subjects were all males. So achievement and family size may both be a function of Westernization, and may have no mutual causal relationship.

The results of these studies suggest that some generality exists to support the assumption that scholastic achievement is negatively correlated with family size. Cross-cultural support, subject to the reservations stated, is one feature of this research.

Family size has also been related to extra-sensory perception in a rather superficial study by Green et al. (1966) and sex roles by Rosenberg and Sutton-Smith (1964) and Kammeyer (1966). Rosenberg and Sutton-Smith found that family size was a significant factor in their study of ordinal position and sex role identification. They found e.g. that children in one, two or three child families are differentially affected by the reinforcements in sex role learnings afforded by parents and siblings; that anxiety decreased as family size increased.

To summarise these studies from the viewpoint of relevance to the present research, it seems that the major factor to emerge is the significance family size can possess as an experimental variable. Rosen e.g. found its influence to be more potent than that of ordinal position, and this finding is directly relevant to the current research. Rosenberg and Sutton-Smith found that the effects of ordinal position on sex role identification vary with family size, i.e. that family size acts in a contextual sense, with birth-order.

With this finding from diverse studies being so

consistently apparent it is necessary, because of their importance to this writer's research, to re-examine Schachter's (1959) series of studies and theoretical assumptions to investigate the significance of family size as a variable.

Schachter had considered the possibility that family size was a confounding variable with regard to his findings on ordinal position. If his experimental differences were due to family size then, when this variable was held constant, there should be no differences which could be related to ordinal position. To clarify the position he reanalysed results from his early experiments comparing subjects from small families (< 4 sibs.) with those from large families (> 3 sibs.). Family size differences were evident with subjects from small families choosing the affiliative condition more often than subjects from large families regardless of birth-order. Similar differences were evident on analyzing the levels of anxiety which could be manipulated. Subjects from large families appeared to be less anxious than those from small families, a finding which Schachter attempts rather speculatively and unconvincingly to explain by socio-economic

and rural-urban differences, and even "experience at repairing electrical gadgets"! (P.56). When anxiety is held constant, although the proportionate ordinal differences among those choosing to affiliate still remained large, the family size differences decreased. His argument disposing of family size was based on the following table. One cell contains seven subjects whereas the remaining three critical cells range from fifteen to twenty-four.

Table 2

Effects of Family Size when Anxiety Held Constant

	2-3 Children		4+ Children	
	N.	% choosing tog.	N.	% choosing tog.
First Born *	24	83.3 (n = 20)	7	71.4 (n = 5)
Later Born	21	42.9 (n = 9)	15	13.3 (n = 2)

* Excludes only children (N = 9 % age. = 77.8)

(Schachter (1959) P. 56)

A shift of only one subject from this smallest cell would give a result with a proportional cell entry of 57.16,

instead of 71.4 leaving the proportionate ordinal differences for the two family sizes much more even. However, a more meaningful comparison is in terms of total proportions if use is to be made of Schachter's rather insensitive statistics. Thus the total proportion of first borns (excluding only children) who chose to affiliate is .81, (with only children it = .80) while the proportion for later borns is .31. Similar proportions of affiliation choices for family size are small .64, and large .32. This suggests that Schachter may have been premature in suggesting that "family size has no effect on the affiliative response of anxious subjects." These results as analysed by the writer suggest that family size, while not appearing to operate as strongly as ordinal position in the Schachterian data, cannot be so quickly dismissed as being of little consequence.

What of the other studies to which Schachter refers? Bakan's data on alcoholism is used with the caution that the results allow for no control of family size. Schachter does concede that the obtained ordinal differences "are exaggerated by the artifactual effects of

family size." Torrence's data on fighter pilot effectiveness is claimed to show the predicted ordinal effect independent of family size influence. Re-examination of the data suggests that Schachter's conclusion, in this instance, is partly justified although there is a slight trend for aces to come more frequently from large families (> 3 sibs.) and non-aces to come more frequently from smaller families. This agrees with the differential effect that family size has been shown to exercise on anxiety. Haeberle's study deals with a small sample of cases and any meaningful analysis for family size is considered not possible by Schachter. The data presented by Schachter preclude further examination.

From the preceding discussion, the writer suggests that Schachter has not accorded family size the attention it warrants. From re-examination of his own experiments and the work of Bakan, Torrance and even Haeberle, it is possible that this variable can have an important contextual role as has been suggested by Rosen (1961) and Rosenberg and Sutton-Smith (1964). Their studies,

together with those just reviewed, and the independent studies of family size reviewed earlier in this chapter, give added significance to the consideration of family size as an important variable in the current research.

It is perhaps surprising, in the light of the confused results which have emerged in birth-order studies, that researchers who have been influenced by Schachter, have not given attention to family size as a contextual variable. This may be due to the way Schachter dismissed the variable from consideration in his publication, but it remains a regrettable inadequacy in the subsequent research.

Summary:

Independent studies making use of family size as a variable are reviewed. Experimental evidence suggests that the size of a family can exercise causal effects on subsequent personality, by way of child-rearing roles and sibling interaction. Achievement has been shown to be related to family size, when measured by T.A.T. devices or scholastic success. A re-examination of the studies recorded in Schachter's (1959) publication suggests that Schachter in stressing the importance of ordinal position, may have underestimated the effect of family size as a variable. Such a view finds support in the results of later studies, Rosen (1961) and Rosenberg and Sutton-Smith (1964). It is noted that almost no attention has been given to this variable by studies which have followed in the Schachterian tradition.

CHAPTER 5

A Literature Review of Some Aspects of Risk-Taking Behaviour

The last decade has seen considerable changes in the traditional fields of research interest in psychology, particularly those which have relevance to thinking, motivation and cognitive processes. One of the causes of these and similar changes has been the influence of theoretical writings from other social sciences. Economists have been concerned for some time about how people make decisions, where some element of risk is involved. Theorists have probed two aspects of decision behaviour; the desirabilities of expected alternative outcomes, and the respective probabilities of the outcomes in question. This work by economists posed questions for psychological investigations in traditional areas such as thinking and problem solving. The presence of consequences or "pay-offs" implies issues of personality and motivation, while the evaluation of outcomes is influenced by e.g. attitude.

The attention of psychologists was spurred by early researchers such as Bruner, Goodnow, and Austin in the middle 1950's, while a preliminary phenomenological

approach was that of Cohen and Hansel (1956).

Since this time there has been a number of studies which have examined decision-making in general, and risk-taking behaviour in particular. This chapter will briefly review those which are relevant to the current study, focussing on variables which have been associated with risk-taking behaviour and some of the more pertinent theoretical assumptions. Particular attention will be given to those studies which have examined sex differences in risk-taking behaviour.

One of the major issues to date in studies of risk-taking behaviour has been the debate between devotees of risk-taking and conservatism viewpoints in group decisions. These theorists seek to determine whether or not group decisions produce more risk-taking than individual decisions. A series of studies is relevant. Stonner (1961), Marquis (1962) and Wallach Kogan and Bem (1962) have attacked the problem by means of the paper and pencil problems of Wallach and Kogan (1959). In general the subjects read an abstract, which presents a hypothetical risk situation, with a choice of alternative and variable-risk courses of action. From these, the subject makes a private choice

of which alternative he favours most. The problems are then re-administered following group discussion and changes in risk-taking behaviour can be assessed. These studies, based on student and business executive subjects of both sexes, suggest that group decisions and post group individual decisions produce greater risk-taking than the initial private choices. Marquis suggests this may be due to the "shifting of responsibility to the group" when the choice of a more risky alternative is made. This regularity of result is restricted to the Wallach and Kogan stimuli. Other studies using different measures of risk-taking yield contrary results. Wallach et al. (1962) report two studies, Lonegran and McClintock (1961) and Hunt and Rowe (1960), which failed to find any differences between group and individual conditions using betting preferences and investment decisions respectively. Atthowe (1961) compared individual and dyadic decisions in a task requiring choice between two wagers. He found that the dyadic choices were significantly more conservative.

These conflicting results raise the problem of the possible generality of risk-taking propensity as a personality trait. Slovic (1962, 1964) has given some attention to this problem. In the earlier study, Slovic attempted a "convergent validation" (Campbell & Fiske 1959) of risk-taking measures assumed to be positively related. He found that only five of his twenty-eight correlations were significant. Following his 1964 review of three risk-taking categories, (response set and judgement, questionnaire, and probability and variance preference measures) Slovic concludes that there are sufficient positive results to encourage the notion of risk-taking as a general propensity. The lack of convergent validation across measures, he concludes, is due to the ignoring of subjective and situational factors which can influence this behaviour. Research e.g. indicates that the chance-skill distinction may be empirical as well as analytic. Atkinson Bastion Earl and Litwin (1960) found that the relationships between need achievement and risk-taking were greater in skill situations than chance situations. Littig (1962) showed that skill

oriented groups preferred lower objective probabilities of winning than did chance oriented groups. Slovic also suggests that conflicting results could be due to the multi-dimensionality of risk-taking behaviour. He instances the work of Coombs and Pruitt (1960) who conceptualized risk in terms of skewness (probability) and variance.

Coombs and Pruitt argue that in addition to probability preferences, variance preferences are indicative of a subject's utility for risk. The variance of a bet reflects the amount of deviation of its possible outcomes from the average amount of money to be obtained by playing the bet. Thus a bet offering even odds to win or lose $5.00 has a larger variance than a bet offering the same odds to win or lose $1.00, although the expected value is the same - zero.

Coombs and Pruitt (1960) found sizeable individual differences in probability and variance preferences, as did Slovic in an unpublished replication, but that these differences were not always stable. This lack of stability in betting preferences was also found by Royden

Suppes and Walsh (1959), but consistent variance preferences were found by Davidson and Marschak (1959) and Lichtenstein (1962).

Myers et al. (1960, 1962) and Katz (1962) have investigated the effects of variance as a payoff variable on the decision to take risks. Subjects were asked to choose between known payoffs, which varied from +1 to -1 and unknown payoffs with variance ranges of up to +16 to -16. The optimum strategy was to accept the known payoff when it was positive; if negative the subject should select the unknown payoff. The experimenters found that as the variance of the gamble increased, subjects became more conservative, tending to "avoid the larger potential losses more than they approached the equally larger winning outcomes." As predicted all subjects gambled more when the known payoff was negative.

The study of probability preferences has been stimulated by the work of expectancy theorists such as Atkinson (1957). They use a risk-taking model with six variables:

$$\text{Risk Motivation} = (M_s \times P_s \times I_s) + (M_f \times P_f \times -I_f)$$

Where P_s = subjective probability of success

P_f = subjective probability of failure

I_s = incentive value of success

I_f = negative incentive value of failure

M_s = the achievement motive

M_f = the motive to avoid failure

The motivation function has a maximum at $P_s = .5$ if $M_s > M_f$ and a minimum at $P_s = .5$ if $M_f > M_s$. Thus Atkinson predicts that individuals in whom $M_s > M_f$ will prefer tasks with intermediate P_s while persons dominated by M_f will prefer tasks in which P_s is high or low. In general, studies of risk-taking in achievement oriented skill situations have supported the model, while probability preferences in chance situations have led to conflicting results. (Slovic 1964).

Various studies have attempted to relate differing variables to risk-taking behaviour. Lonegran and McClintock (1961) studied the effects of group membership on female students performing a simple betting task. They found no significant differences in risk-taking between coacting and interdependent groups or "alone" conditions, although there was some convergence of betting

towards a common norm within groups over repeated sessions. Hancock and Teevan (1964) found subjects who were high on a T.A.T. measure of fear of failure chose the most difficult odds in a chance risk-taking game, and made more irrational moves when the t + 1 trial was compared with trial t.

Various personality and intellective measures have been related to risk-taking. Rim (1964) showed personality differences, as indicated by social attitudes, measured on R. &. T. Scales (Melvin 1953), were related to such risk-taking measures as initial risk-taking, post discussion decisions and influence on others' decisions. He found e.g. that those subjects high on tough-mindedness and average on a radical-conservative scale made the most risky initial decisions. The high radical and high tenderminded group shifted most in a risky direction following group discussions. Raynor and Smith (1966) showed a clear relationship between high achievement, measured projectively and objectively, and preference for intermediate probability risks, as had Scodel Ratoosh and Minas (1959). These latter investigators also found that intelligence as measured by Wechsler Vocabulary subtest

scores, was not related to risk-taking, but that variability was inversely related to higher intelligence, a finding which was not replicated by Liverant and Scodel (1960). Swineford (1941) had found risk-taking to be independent of scholastic ability in ninth grade boys and girls, but Kogan and Wallach (1964) showed that intellective processes needed to be controlled in studies of some aspects of risk-taking, instancing category width as an example.

Recent studies indicate that risk-taking behaviour may be partially determined by the reality of consequences, outcomes have for the subject. The Kogan and Wallach problems e.g. are largely laboratory abstractions - the subject is not affected by the outcome beyond the immediate experimental environment. Feather (1959) found that subjects in a chance situation chose more probable goals when choice involved commitment to action. Slovic et al. (1965) found differences in bet choices under make believe and real gambling situations. In the former situation, subjects became bored more quickly and adopted differential strategies to reduce the tedium. However Katz (1962) has found that the size

of a monetary incentive has no effect on risk-taking behaviour, although the interaction of value of the incentive, and range of variance was significant. Similar results which support the need to control for incentive effects by real rewards come from Shulman (1961) and Rawson (1961).

The use of real rewards and losses, as consequences of decisions, creates another source of variance for risk-taking behaviour namely, that due to sequential reinforcement. As Berlyne (1960) suggests, this can produce fluctuations in risk-taking behaviour. The precise nature of the relationships between risk-taking behaviour and reinforcement is unknown, but the effect of sequences on subjective probabilities has been given attention. e. g. the gamblers' fallacy Cohen and Hansel (1956) and Myers and Sadler (1960). One negative finding, Slovic et al. (1965), found betting behaviour to be quite unaffected by previous payoffs. However Kogan and Wallach (1964) had found that risk-taking decreased as the cumulative monetary winnings increased.

Two ecological variables, age and sex, have been related to risk-taking behaviour.

Wallach and Kogan (1959) found that young men (students) were significantly higher in confidence than older men (mean age - 70 years) but females exhibited no such difference. For both sexes, older subjects were less willing to choose extreme risk-taking alternatives than younger subjects. Kass (1964) had six, eight, and ten year-old subjects playing slot machines. He found no age differences in his sample, but concedes that this could have been due to the small number of subjects (N = 42). Slovic (1966) in his study of risk-taking, in a chance situation, using 1,047 subjects aged from six years to sixteen years, noticed some age differences. For boys, risk-taking increased from six to eleven years and then remained constant. For girls, risk-taking initially remained constant to nine to ten years, decreased at age eleven, returned to the original level at age twelve and decreased again at fourteen. However these subjects were volunteers and, as will be discussed later, this can be assumed to have contaminated the results by producing a biased sample of subjects who have already taken a risk i.e. by volunteering.

A small number of studies has related risk-taking

behaviour to sex differences. Some sex typing of risk-taking behaviours seems common to many cultures, and these appear to be socialized at an early age. Boys are typically expected to become more daring than girls. Tuddenham (1952) has shown that as early as the initial school days children picture the typical boy as more daring than the typical girl. The same author (1951) showed that boldness was positively correlated with popularity for boys, but negatively for girls.

Swineford (1941) asked ninth grade subjects to indicate the number of points they wanted each question on an achievement examination to be worth, with the knowledge that the allocated points would be deducted if a question was incorrectly answered. He found that boys had higher scores on his gambling index than girls. Crandall and Rabson (1960) reported that boys were more perseverent under threat of failure on an intellectual achievement task than were girls. Kass (1964), using a slot machines, found boys preferred low and medium probabilities of payoff (which were of equal expected value), significantly more often than did girls.

Anastasi (1958) records that adult observers around

a playground and at home rated boys and their activities as adventurous and girls as sedentary and conservative. It is not clear, however, whether or not this is a function of rater bias in conforming to a cultural expectancy.

Suchman and Schertzer (1960) have suggested that risk-taking is a possible determinant of accidents and Cohen and Hansel (1956) suggest a similar relationship for criminality. In both cases, boys exceed girls in rates and severity, - of childhood accidents (Douglas & Blomfield 1956) and delinquent offences (Anastasi 1958). Yet the reasoning, if it is to support the relationship is essentially intuitive and controlled investigation of the variables is needed.

Kogan and Wallach (1964) offer evidence of sex differences in their 1959 study, but as already quoted these seem to interact with age. In their 1964 study, e.g., they found that in chance seetings, females select more extreme strategies than males in either risky or conservative directions.

Tajfel et al. (1964), report a negative finding in a study of individual judgement consistencies in risk-taking.

They found no sex differences either in measures of category width or measures of risk-taking behaviour.

Finally Slovic (1966) found sex differences in his experiment on risk-taking in a chance situation. Except for the youngest age group, boys more frequently than girls accepted higher probabilities of reward loss before declining to continue, along a line of switches where the probability of loss increased from 0.1 to 1.0 when the preceding response had been rewarded. Slovic notes however that his subjects were volunteers at a fair and included only those who were curious or daring enough to volunteer for what was "obviously a risk-taking game". It is of course conceivable that this was in part balanced by some subjects "volunteering" as a result of social pressure from their more daring peers.

It would appear that risk-taking behaviours are specific to the situation and stimuli used, although there is some limited evidence to suggest that a generalised risk-taking propensity exists. Studies which contrast group and individual decisions support this

contention. Slovic (1964) has shown that conflicting results may be reconciled if attention is given to situational and subjective factors and postulates the likelihood that risk-taking behaviour is multi-dimensional, as Coombs and Pruitt (1960) have suggested, in their distinction between probability and variance. Various personality and intellective processes have been found to be related to risk-taking behaviour. Studies which use the Atkinson model in skill-achievement situations have generally found that subjects with high motivation to succeed prefer tasks with intermediate subjective probabilities of success while subjects with a high motive to avoid failure prefer extreme subjective probabilities of success. Chance situations however produce results which do not fit the model. More consistent findings suggest that risk-taking behaviour is dependent upon the reality of the outcomes for the subject (Feather 1959, Slovic et al. 1965) although Katz presents a negative finding. Similar support, with one negative finding (Slovic et al. 1965), is offered on the contaminating effect of sequential reinforcement. Studies seem to in-

dicate a slight trend for risk-taking to decrease with age but this appears subject to sex variation. Sex differences appear to be quite marked in risk-taking behaviour. With the exception of Tajfel et al. (1964) male subjects exhibit greater risk-taking behaviour than do female subjects in studies which have used a variety of risk-taking measures.

Summary:

Literature on some aspects of risk-taking behaviour is reviewed. Studies relating to the issue of group v individual risk-taking indicated apparently inconsistent results, but this conflict appears to be largely a function of the stimulus material. The theoretical contributions of Slovic (1964) Coombs and Pruitt (1960) and Atkinson (1957) are discussed. Finally, the literature which relates risk-taking behaviour to various ecological, personality and intellective measures is referred to, this section concluding with a more detailed account of studies using age and sex as independent variables.

CHAPTER 6

The Rationale and Aims of the Present Research

This study was essentially an extension of the research relating to birth-order and dependency linked behaviours, derived directly from Schachter (1959). The specific dependency linked behaviour selected for attention was conformity. Research on the relationships between birth-order and conformity had yielded conflicting results, a situation which has not improved with the publication of the Becker et al. (1966) study, subsequent to this writer's research programme.

It was considered that research into this area should attempt to clarify some of the contentious issues which remain such as sex differences in conformity behaviour. Some examination was to be given to the experimental validity of the Becker et al. findings on ordinal differences in conformity behaviours. The writer considered that the investigation should be as distinctly behavioural as possible. This would produce a closer simulation of the extra laboratory world, as recommended by Sherif (1961), and outcomes would have real consequences for the individual. This also heeds the Veroff (1960) criticism of the artificial and abstract nature of Schachter's experimental

variables.

A review of the literature on family size indicated the potential importance of this variable in birth-order research. For this reason, family size was included in this research, as a major variable. It was anticipated that this variable would exercise an effect on the operation of ordinal position in the experimental study.

To extend the findings of the birth-order literature attention was given to Schachter's (1959) anticipation that "other dependency-linked behaviours will eventually prove to be related to ordinal position." It seemed intuitively credible that risk-taking behaviour offered one such possibility. Presumably, the individual who is consistently prepared to take greater individual risks in a given situation, when there is no assistance, is exhibiting more independent behaviour than the individual who adopts the more cautious strategy. Similarly, this hypothetical situation offered a possible means of a direct test of conformity behaviour. Subjects could be compared on their risk-taking responses when these were given with the knowledge of contrived group norms.

Thus, consistent differences between groups of subjects who were high on either individual risk-taking or risk-taking conformity and groups who were low on either dependent variables, should be a function of ordinal position.

The above rationale was based on a tenuous assumption, namely that risk-taking behaviour was positively related to independence; or conversely negatively related to dependency behaviours such as influencibility and conformity. However, the rationale was not based solely on assumption. There was empirical evidence for a positive relationship between independence and risk-taking behaviour. Kogan and Wallach (1964) in an extensive study of the relationships of personality variables to decision-making found independence, as measured by their Independence-Yielding scale, was related to risk-taking behaviour in chance situations, for male and female subjects, although the findings were subject to some moderation when test anxiety and defensiveness were considered as moderator variables.

Unlike some previous researchers interested in birth-order relationships the writer did not accept the above reasoning and the single case of experimental support as

sufficient to establish the relationship conclusively. But it was considered sufficiently credible to warrant further investigation in a chance situation.

Thus the study would examine evidence for the tenability of the ordinal - position - conformity relationship, and extend the research by seeking links between birth-order and another possible dependency linked behaviour, namely risk-taking.

An experiment was designed to test the following hypotheses:

1. First born and later born subjects will differ in the amount of risk they will accept in an individual decision-making situation.
2. Subjects from small families and subjects from large families will differ in the amount of risk they will accept.
3. Male subjects and female subjects will differ in the amount of risk they will accept.
4. First born and later born subjects will differ in the degree to which they will conform to hypothetical group norms.
5. Subjects from small families and subjects from

large families will differ in the degree to which they conform to hypothetical group norms.

6. Male subjects and female subjects will differ in the degree to which they conform to hypothetical group norms.

The hypotheses make no distinction between first and only born children. This agrees with Schachter's usual method of subject grouping into first and later born, which is also the distinction adopted by the majority of the later studies.

Two further hypotheses relating to decision times were initially framed for investigation. However, it was found in the early part of the experimental investigation that inadequacies had developed in the kymograph used to record these times. This resulted in too much error variance for accurate or meaningful analysis.

CHAPTER 7

Experimental Design and Procedure

An experiment was designed to test the hypotheses outlined in the previous chapter. An attempt was made to structure the task so that it did simulate a real decision-making situation in which the subject would experience positive or negative outcomes of some consequence beyond the immediate experimental situation. (Kogan and Wallach 1964, Slovic 1964). A similar consideration was made concerning the conformity variable (Sherif 1961). For these reasons, it was decided to choose behavioural measures rather than the self report and rating dependent variables which have figured so prominently in the Schachterian tradition.

The research literature has shown that performance on a dependent variable, in risk-taking and conformity situations, can be influenced by the ambiguity and difficulty of the stimulus material. (e.g. Wiener et al. 1957, Luchins and Luchins 1955b, Crutchfield 1955, Walker and Heyns 1962). As it is difficult to control the degree of ambiguity or task difficulty which each subject will experience, an experimental task was chosen which

was largely non-ambiguous , which contained a comparatively low cognitive content and which required a low level of psycho-motor skill.

Subjects:

The subjects were ninety-six ten to twelve year-old children chosen from a population which consisted of the 1966 form one intake at a city intermediate school. The male and female subjects were placed into eight matched groups as follows:-

Group	Subjects	
Control	6 males	6 females
First born Only Children Small Family	"	"
First born children Large Family	"	"
Youngest children Small Family	"	"
Youngest children Large Family	"	"
Intermediate children Second Small Family	"	"

Group	Subjects	
Intermediate children Second and Third Large Family	6 males	6 females
Intermediate children Fourth plus Large Family	"	"

The essential ordinal distinction, as presented in the hypotheses, was between first born and only children as opposed to later born. No hypotheses were made concerning the effects of sub-groups of later born children, as no research was available to guide such a formulation. It was however decided to differentiate these subjects as shown to allow for comparisons in the analysis.

A distinction was made between large and small families after the third sibling. Thus a small family consisted of three siblings or less while a large family consisted of four siblings or more. This is in line with Schachter's 1959 distinction (P. 56). It is also the most convenient distinction in a cultural sense, as the average expected number of siblings for a New Zealand family is 3.703 (See Appendix F.) The average number of siblings per family in the experimental population was 3.89, which was above

the dominion mean.

The groups were matched for sex, age, intelligence (as measured by the Australian Council for Educational Research Intermediate Form D,[1]) and the occupational class of subjects' fathers, (as measured by the Congalton and Havighurst Scale (1954)[2]). Residential homogeneity was obtained by selecting a school in an established area, known to have a large proportion of lower middle class homes, in terms of property values. Sibling age interval was also controlled. Subjects were sampled from the full range of age differences found in each ordinal group population.

Table Three presents summarized details of the

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[1]This test was administered to 3527 children in the Christchurch area as a classifactory device for intermediate schools in 1965. The test, which is speeded, contains numerical and verbal items. The median score in the above population was 105.3, the 25th percentile score was 95.6 and the 75th percentile score was 113.6.

[2]Occupations not classified by Congalton and Havighurst were rated by staff and student judges of the Psychology Department University of Canterbury following the 1954 procedure, and from this a scale value was derived.

matching between groups on three variables. None of the differences in intelligence scores were significant when tested by Student's t-tests for the significance of difference between two means. The occupational class index, ranges through one scale value on a seven point scale. Yet it is apparent that the range is not great as the occupations on the Congalton-Havighurst scale nearest to the extremes, 4.67 and 5.67, are self-employed electrician and furniture store salesman.

Table 3

Group	Mean Age (Years)	I.Q. ACER Int.D*	Mean Class Rating Congalton-Havighurst**
Control	11.10	107.2	4.92
F.B./O Small	11.9	107.9	5.00
F.B. Large	11.9	107.8	5.41
Yng. Small	11.9	105.5	4.67
Yng. Large	11.11	102.8	5.63
2nd & 3rd Large	12.0	102.4	5.67
4th+ Large	11.8	101.8	5.58
2nd Small	11.11	104.3	5.09

* $S.E._m$ = 3.52-4.65

** Rating range 1-7

Apparatus:

The apparatus constructed to test the hypotheses was an adaptation of that used by Slovic (1966). Photographs and diagrams of the equipment appear in Appendix A.

Essentially, the apparatus consisted of a console with display and control surfaces facing the subject. On the control surface, were ten toggle switches, placed in a numbered series and two additional switches set at the extremes of the series and marked as stop switches. The display panel contained twenty red and green jewelled panel lights, one of each colour for each of the switches in the series. In addition, a white-opaque subject warning light was placed on the display panel.

An operator control panel was situated on the reverse side of the console. This contained controls which could pre-set a connection between the toggle switches and jewelled panel lights, so that when a switch was activated either a green light or red light would function. Controls also were provided to operate the subject's warning light, and

a Ralph-Gerbrands 4 pen kymograph recorder, which recorded trials and responses-decision times.

An experimental screen was placed between the subject and the recorder, although no attempt to maintain secrecy was made during the experimental session. Plastic bowls were used as reward receptacles for the poker chips which served as tokens during the experiment.

The Experimental Design:

This experiment followed an 8 x 2 x 2 (Birth-Order x Sex x Conformity) design with repeated observations on subjects in the two conformity conditions, - individual and social influence situations. This meant that the seven birth-order groups received identical treatments; a standardized learning session, an individual risk-taking session, of three critical and two non-critical trials, and a group conformity session consisting of three critical trials and one non-critical trial.[1] The control group received the same learning session, and the individual risk-taking session. However this group received

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[1]This follows Slovic's (1966) suggestion that following studies should repeat trials for each subject.

no group normative information and their final session consisted of three critical and one non-critical individual trials. (The design is summarized in Table Four).

During the standardized learning session practice trials were given. The position of a red light on the last three of these trials was chosen randomly. All subjects experienced meeting a red light and understood, that in the course of the experimental task this would mean that rewards would be lost.

On critical trials, in the individual and normative situations, switches were pre-set so that a red light would flash only if switch number ten was activated as suggested by Slovic (1966). However the subjective expectancy was that the occurrence of a red light was equiprobable for each of the ten switches. On non-critical trials, the apparatus was set so that a red light would flash as either switch number three five or seven was activated. The non-critical trials were placed following trials one, three and five to provide all subjects with regular situations with a higher probability of meeting a red light, and experiencing the loss of rewards. This

Table 4

The Experimental Design

Session	Control Group (n = 12) Trial	Red Light Setting	Norm Setting	Experimental Groups (n = 84) Trial	Red Light Setting	Norm Setting
Learning	P_1	4	-	P_1	4	-
	P_2	8	-	P_2	8	-
	P_3	2	-	P_3	2	-
Individual	T_1	10	-	T_1	10	-
	T_{1A}	3	-	T_{1A}	3	-
	T_2	10	-	T_2	10	-
	T_3	10	-	T_3	10	-
	T_{3A}	7	-	T_{3A}	7	-
		Confidence Rating			Confidence Rating	
Group Norm	T_4	10	-	T_4	10	3,5 or 8
	T_5	10	-	T_5	10	3,5 or 8
	T_{5A}	5	-	T_{5A}	5	-
	T_6	10	-	T_6	10	3,5 or 8
		Confidence Rating			Confidence Rating	

T_{1A} T_{3A} T_{5A} were non-critical trials. These were not included with the trials which were analysed.

was designed to give added credibility to the critical trials.

In terms of the usual division in risk-taking studies the gambling situation in this study was a chance rather than skill bias. However Slovic (1966) has shown that the task does have an optimum performance strategy, which is to cease after selecting the fifth switch (See Procedure). This implies that the task has a cognitive component which will reflect intellectual differences among the subjects. However, it was considered that the difficulty of deriving the optimum choice strategy would prove beyond the logic of ten to twelve year-old subjects, and to this extent, the decision-making situation could be treated as approximating a chance level, and thus would reflect ecological and/or personality differences, rather than cognitive.

Hypothetical group norms for choosing to stop were set at three, five and eight for the final three critical trials and their order of presentation was randomized within groups. Three norm levels were used to ensure that at least one norm would be close to the individual risk-taking level that

the subject had accepted during the first part of the experiment. Furthermore it was considered that if these diverse norms could be shown to affect risk-taking, the range of differences between them would lend strength to an influence interpretation.

A symmetrical five point confidence rating scale was administered following Trials 3A and 6. i.e. after the individual and social influence sessions, to give some indication of possible confidence changes from individual to social conditions.

The only experimental manipulation used in the experiment was in the social influence condition. The individual condition was the standard risk-taking situation. Social influence was introduced by instructing the subject about the hypothetical behaviour of other pupils. While this may initially seem to be an artificial form of social influence, it is no less a group influence than some of the simulation techniques (e.g. Crutchfield) already used, or real life social influence arising e.g. from a reference group. Allen (1965) has shown the fallacy of ignoring reference groups. This procedure makes the effects of the reference group salient. In terms of the Deutsch and

Gerard (1955) distinction the conformity set has possibly a higher component of "informative" influence than "normative". But this writer contends, as has Allen (1965), that such a distinction is not representative of real social influence and is experimentally unverified. This point will be returned to later.

Finally, anxiety was not manipulated in this experiment, partly because of the ethical problems of such study with juvenile subjects. Furthermore it was felt that the experiment, if conducted in a condition approximating non-anxiety, would offer a more stringent test of the hypotheses.

Rewards:

The reward materials used in this research were sweets. At the beginning of the experimental session, each subject was presented with eight varieties of sweets, from which he was asked to select those he liked most. The eight varieties were the most popular choices among the subject population as derived from the initial questionnaire form (Appendix C). Subjects who had responded that they did not like sweets in general or had neutral feelings toward them were

eliminated from the subject sample.[1] During the experimental session, reward tokens were used. Each plastic chip was equivalent to one sweet of the variety chosen, a packet of which, was placed beside the console during the experimental session. To maintain the token relationship, chips were called sweets during the session. This method of rewarding introduced the element of realism suggested by Kogan and Wallach (1964) and Slovic (1964).

One further point should be noted. As the following procedure will show, subjects were rewarded in the final conditions according to their risk-taking behaviour, not in relationship to the degree of conformity or the nature of the normative response displayed. (Endler 1966) It could be expected then that there would be no direct influence of rewards upon conformity behaviour. A discussion of possible indirect effects follows later.

Experimental Procedure:

One month prior to the experimental session, a short questionnaire (Appendix C) was administered to 263 children

[1] In fact only two subjects of the original 96 chosen were in this category. Both were replaced with alternatives who satisfied the subject controls criteria.

in an urban intermediate school. The questionnaire contained questions relating to ordinal position, family size, age, sex, father's occupation and the sweet preferences of the subject population. This information allowed a choice to be made of matched experimental and control groups as previously outlined.

The experimental session was conducted by an experimenter and a console operator, and followed a standardized procedure which is reproduced in Appendix B. The only major departure from the standardized form was in the answering of subjects' questions relating to the instructions given.

The subject, upon entering the experimental room (which was arranged as in Appendix A), was asked to choose between eight varieties of sweets. It was then explained, that chip tokens would be used during the game for reasons of hygiene. The subject was then asked to place his more favoured hand on a marked pad and a measure of response latencies was taken for each of the ten switches in the experimental series. The subject's response cue was, in this case, and for the remainder of the experiment, the opaque

warning light on the display surface of the console.

The subject was then taught the "rules of the game". He was told that each time the game was played, nine switches would be connected to green lights, and one switch would be connected to a red light, but that this latter connection would differ with each trial. The reward structure was explained to the subject. Prior to each decision in a trial, the subject was required to bet one sweet. On the cue, the subject could pull the following switch or either stop switch. If the next numbered switch was pulled, and a green light flashed, the subject kept his bet and won a bonus sweet, but if a red light flashed he lost all sweets he had bet or won during that trial. This personal risk was adopted following a suggestion by Kogan and Wallach (1964) who recommended that reality in risk-taking behaviour simulation necessitates some form of investment (P.7). If the subject wished to stop at any stage of a trial and keep his investments plus winnings, he could flick either stop switch, and the trial ceased.

A card (Figure 1) was then shown to each subject to

indicate schematically how the risk of meeting a red light, if the preceeding decision had given a green light, increased the further along the series the subject progressed. But it was also explained that the further the subject went up to switch number nine, the more sweets could possibly be won.

Three practice trials were then run designed so that each subject met both success and failure.[1] The subject was then questioned to see if he understood that the chances of any number being connected to a red light were equiprobable, and secondly that as a trial continued, the risk of the next switch having a red light connection increased.

The individual risk-taking session was then carried out, with three trials. Two non-critical trials, with the red light connection set at three and seven were inserted after trials one and three respectively. No verbal reinforcement of any nature was given nor any other experimenter cues which might influence risk-taking or

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[1] All subjects experienced at least two losses with a red light connection.

conformity behaviour. (DiVesta 1959, Luchins 1955, Endler 1966).

A five point confidence rating scale (see Table Five) was then presented to the subject. The alternative responses were read out for each question.

The social influence condition was then run. Prior to each of three trials the subject was told that on that particular trial, most intermediate school children tried to reach a given switch (three five or eight) and then chose to stop instead of continuing[1]. A card, such as Figure 2, was then shown to the subject. This indicated schematically, the strength of the norm. One non-critical trial was placed after trial five and the session concluded with a further administration of the confidence scale. Control group subjects did not receive this normative information but merely repeated a further three individual trials together with a single non-critical trial, and finished withare-administered confidence scale.

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[1] The use of peers as a normative reference group follows the Berends (1950) and Blake and Mouton (1961) finding that peers exert more influence, than do adults, on child subjects in conformity situations.

Fig. I. Risk Card.

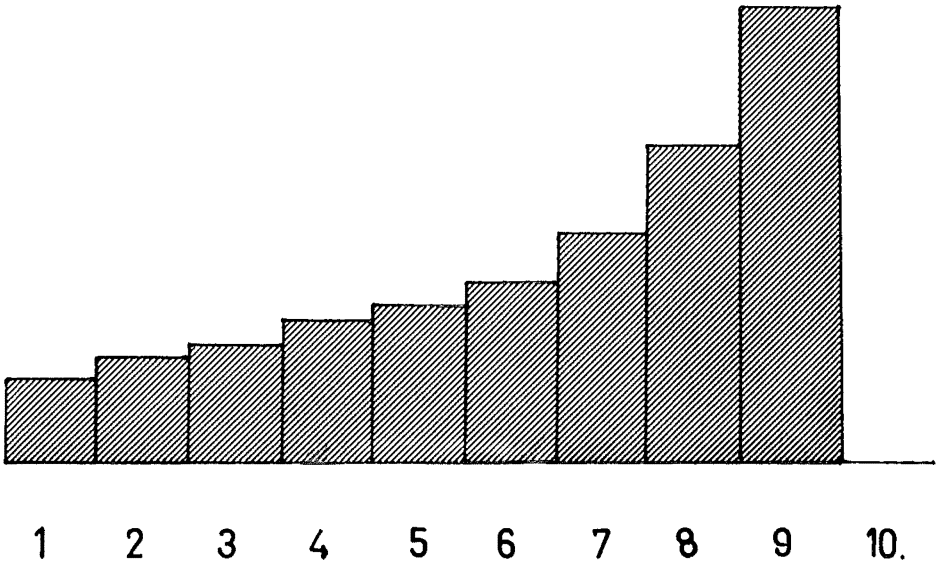
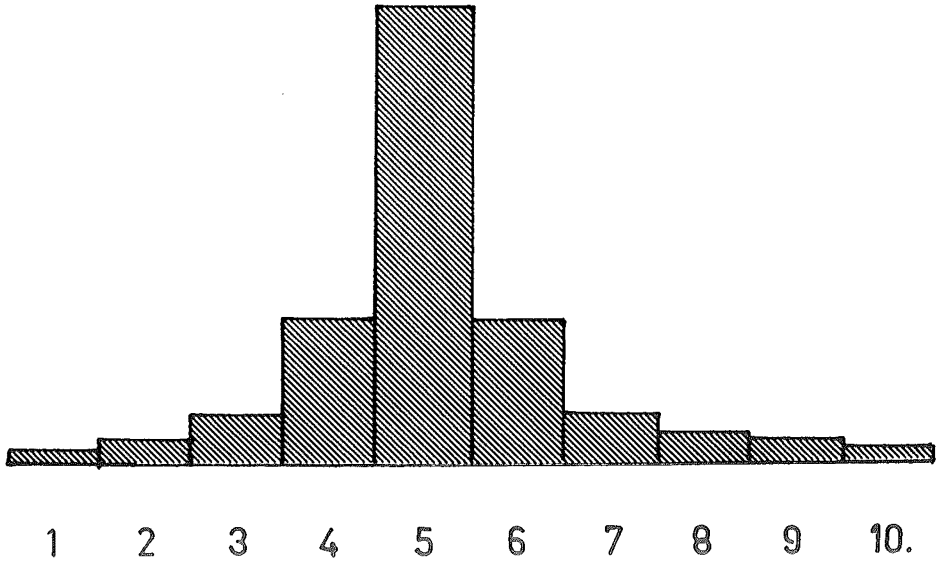


Fig. II. Norm 5.



Following the experimental session, the experimenter questioned the subject about the answers to the initial questionnaire. Further information was gathered concerning the subject's family, social contacts, behavioural and experimental task strategies and prior knowledge of the nature of the experiment. The session concluded with the subject signing a statement to the effect that he would not talk about the study with other children, until the experiment was concluded, upon threat of loosing all winnings.

Rewards were not given to subjects immediately following the experimental session. It was explained that these sweets would be distributed after the final subject was tested and this was in fact done the day following the testing of the last subject.

Table 5

What did you think when you made your choice to stop?

1. Impossible that I was correct.
2. Unlikely that I was correct.
3. Not sure if I was correct.
4. Likely that I was correct.
5. Certain that I was correct.

Summary:

A risk-taking experiment conducted under individual and social influence conditions was designed for ninety-six ten to twelve year-old children, divided into birth-order and family size groups, together with one control group, matched for six variables. An adaptation of the apparatus used by Slovic (1966) was constructed for the experiment in which subject-preferred sweets and tokens were used as rewards. The experiment, following an 8 x 2 x 2 (Birth-order x Sex x Conformity condition) design, with repeated observations on subjects, was conducted in three parts, with a standardized learning period followed by individual and social influence risk-taking sessions. A five point confidence rating scale was used, and the experiment concluded with information seeking questions and a debriefing.

CHAPTER 3

Results

As the subject's expectency of both the probability and magnitude of his potential loss increased with the number of switches pulled, stopping performance on the task was chosen as an index of risk-taking tendencies, following Slovic (1966)[1]. This can be illustrated by Table 6.

Table 6
Subjects Expectency of Probability & Potential Magnitude of Loss at each Switch

Switch No.	Probability of Loss[1]	Potential Loss (Sweets)[2]
1	.100	1
2	.111	3
3	.125	5
4	.142	7
5	.166	9
6	.200	11
7	.250	13
8	.333	15
9	.500	17
10	1.000	19

1. Probability at n if the n-1 switch connection was green
2. This includes bets plus bonuses.

In term of the Coombs and Pruitt (1960) distinction the subjects expectency of the probability of risk increases from switch one to ten. Variance, the deviation of possible outcomes from the mean amount of reward to be expected on a given response, also increases, as it is possible to lose or win more at the end of the series than at the beginning.

[1] The situation differs from Slovic. In his study the subjective expectancies and objective probabilities were the same. In this study they differed, as for critical trials a loss could only occur at switch ten.

The subject's score upon a given trial was given as the number of the switch, from the response series, which was last activated. The experimental index of risk-taking, was the mean stopping switch for each subject over trials one, two and three. The suitability of such an index depends upon the assumption that the subjective utilities for each of the chosen sweets was equal across subjects. While the data cannot be analysed to investigate this problem, it seems not unreasonable that with the choices available, the sampling techniques used and the controls exercised that the subjective utilities for the rewards were not of marked variability. Retrospection data would support this assumption. This point will be dealt with in the following chapter.

The conformity measure adopted was the mean total deviation of each subject from the three hypothetical norms, presented in trials four, five and six.

The third direct experimental measure was the difference of ratings of confidence taken from the two applications of the scale in Table 5. Differences between these two ratings were taken as an index of changes in the level of confidence

as a result of normative information. Comparison with control group results gives an indication of changes in ratings which are a function of increased familiarity with the experimental procedure as opposed to those resulting from the independent variable manipulation.

The statistical analysis of results was conducted by the use of two tests:

1. Student's t tests for the significance of a difference between two independent means, and that for two related means.
2. Mann-Whitney U tests (Siegel 1956) for small and large samples.

The t tests were applied to the risk taking data which were found to satisfy the necessary conditions listed by Siegel (1956)[1]. Mann-Whitney U tests were applied to the conformity data which failed to meet the variance and normal distribution conditions required for parametric tests.

For both tests the level of rejection of the Null Hypotheses was set at the .05 level. All major testing was two-

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[1] Risk taking data for the eight experimental groups were subjected to Cochran's Test for homogeneity of variance, and gave a C value of .19.

tail as the hypotheses were cast in this form. Two-tail tests were also applied to data which were not related to formulated hypotheses.

Individual results for each subject are presented in Appendix E of this report. The next section of the present chapter presents the summarised results.

1. Learning Effect

Scores of the control group, on trials one to six, give a measure of the learning effect or familiarity with the apparatus. The results in Table 7 indicate that no significant learning occurred and that early and later trials may be compared. The means for trials one to three, and trials four to six are not significantly different. The low variability of these results justifies the use of a single mean for trials one to three in the results subjected to further analysis.

2. Measure of Independent Variable Effect

A comparison of the control and pooled experimental groups ranges of responses for the two parts of the experiment gives a measure of the effect of the independent variable. It was assumed that the response ranges for T_1 to T_3 for the

Table 7

Control Group - Learning Effect

$\bar{X}$ Score $T_1 - T_6$

	T_1	T_2	T_3	T_4	T_5	T_6
$\bar{X}$ Score	6.25	5.35	5.75	5.83	6.08	5.58

$\bar{X}T_{1-3} = 5.78$ $\bar{X}T_{4-6} = 5.88$

Stat. Sig.

No diffs. significant

($n = 12$).

control and experimental groups would not be signicantly different, if sampling had been effective. As Table 8 shows, the two groups are not significantly different on a two-tailed test. It was expected that the range of responses for the control group would decrease from trials one to three as compared to trials four to six. Again Table 8 shows that the two measures do differ in the predicted direction at an almost significant level ($.05 < p < .10$). For the experimental groups, the range of responses was expected to increase, if the norms were effective in their operation. As predicted the experimental groups showed this effect ($.05 < p < .10$ with 33 d.f.). Finally, the

Table 8

Independent Variable Effect

$\bar{X}$ Subject Response Range

	$T_1 - T_3$	$T_4 - T_6$	($\bar{X}$ d.)
Control Group	1.92	1.58	(-.34)
Experimental Groups (Pooled)	2.30	2.52	(+.22)

Stat. Sig.

Control T_{1-3} — Control T_{4-6} $t = 1.52$ ($.05 < p < .10$, 11 d.f. 1 tail)

Exp. T_{1-3} — Exp. T_{4-6} $t = 1.475$ ($.05 < p < .10$, 83 d.f. 1 tail)

Exp. T_{1-3} — Control T_{1-3} $t = .834$ (N.S. 94 d.f. 2 tail)

Exp. T_{4-6} — Control T_{4-6} $t = 1.86$ ($.025 < p < .05$, 94 d.f. 1 tail)

range of responses for the experimental groups was expected to be higher than that for the control groups on trials four to six again because of the effect of the independent variable. Again Table 8 shows this one-tail prediction is significant ($.025 < p < .05$). From these results, it can be assumed that the independent variable had some effect. Whether this effect is discriminative in the ways the hypotheses predict will be shown by the later results. However some measure of the discriminative effect can be seen by examining the mean values of stopping points for each of the norm positions which had been randomized over trials four to six. For norm three, the pooled mean over groups was 5.75; for norm five 6.19; and for norm eight 6.94. Thus the norms can be said to have had some discriminative effect in the predicted directions.

3. Risk Taking Behaviour

Results presented in Table 9 and Figure III, record the performances of the subjects in the individual risk-taking situation. These data allow hypothesis one to be tested. First borns accept less risk than do later borns but the difference is small and is not significant. Thus hypothesis one is rejected and the null hypothesis is accepted.

Table 9

Individual Risk Taking

Birth Order Groups.

$\bar{X}$ of T_{1-3}

	Male	Female	Pooled
First Born	4.77	5.83	5.31
Later Born	5.02	5.79	5.40
(Control	5.33	6.22	5.78)

1. All F.B. < All L.B. N.S. ($t = .175$ d.f. = 82)

2. Male F.B. < Female F.B. N.S. ($t = 1.17$ d.f. = 22)

3. Male F.B. < Female Control N.S. ($t = 1.306$ d.f. = 16)

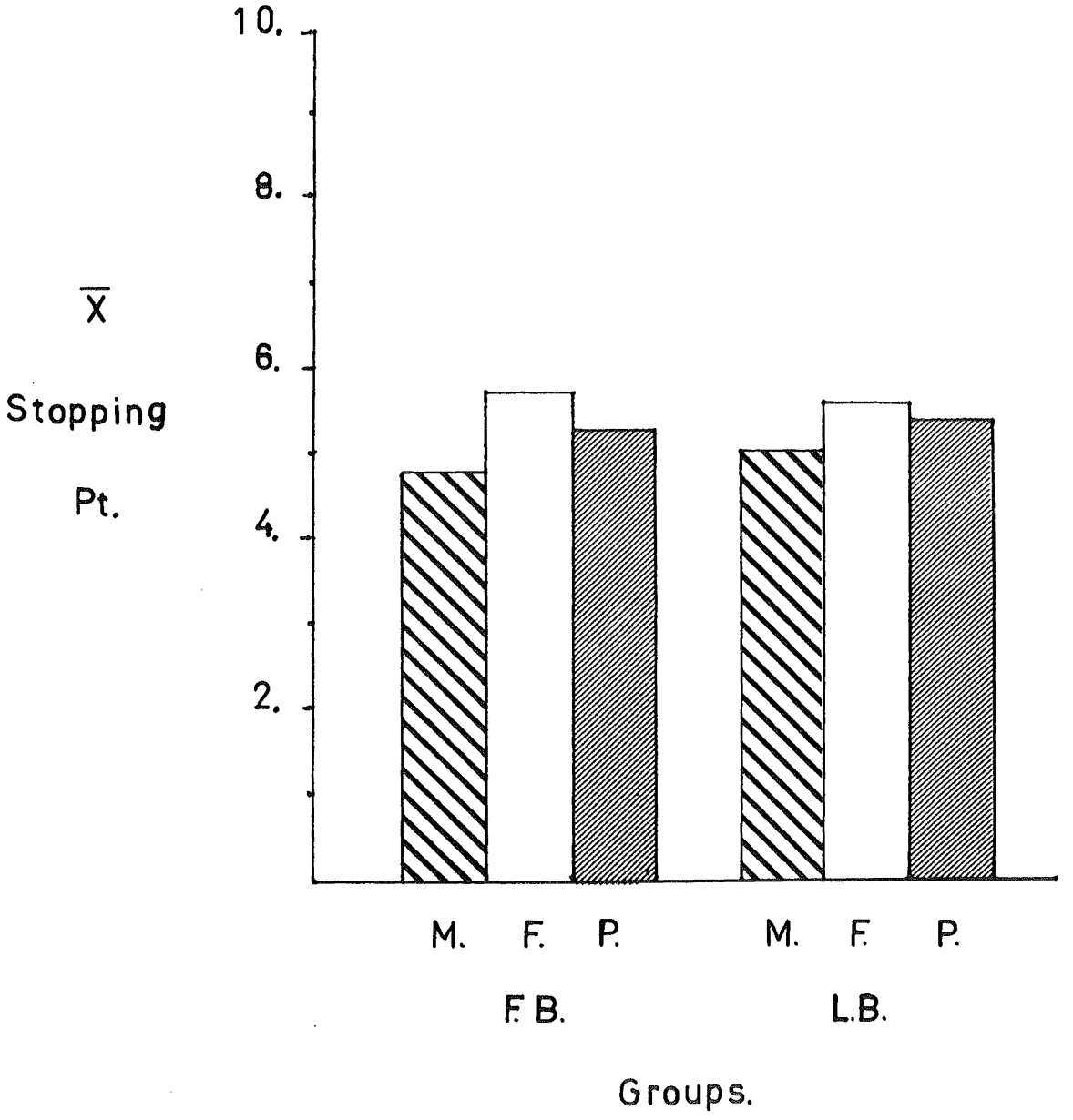
4. All other differences N.S. by inspection

(2 tail tests)

Fig. III.

Risk Taking. Major Birth-Order Groups.

$\overline{X}$ of $T_1 - T_3$



Sex differences can be investigated and it can be seen that first born male subjects show a very slight tendency to accept less risk in an individual situation, than do later borns, but this slight trend is reversed for female subjects. None of these differences approaches the acceptable level of significance.

As each major birth-order group can be divided into family size subgroups and because later borns can be divided into five subgroups, more sensitive analysis of the influence of ordinal position is possible. The relevant data are presented in Table 10. From this table it can be seen that first born subjects from small families take significantly less risks in the experimental situation than do first borns from large families, youngest from large families, and fourth or later borns from large families. For both control group subjects, and all subjects except first borns from small families pooled, comparison with first born small family subjects approaches significance on a two-tail test.

It is possible, from Table 10, to test for the significance of differences between the sexes in each sub group. In all cases females take more risk than males.

Individual Risk Taking - Birth-Order - Family Size Groups

$\bar{X}$ of T_{1-3}

		Male	Female	Pooled
F.B./Only Small Family	(n=12)	4.11	4.72	4.42
F.B. Large Family	(n=12)	5.44	6.94	6.19
Youngest Small Family	(n=12)	4.56	4.94	4.75
Youngest Large Family	(n=12)	5.78	5.83	5.81
2nd & 3rd Large Family	(n=12)	4.44	6.44	5.44
4th & Later Large Family	(n=12)	5.78	6.56	6.17
2nd Small Family	(n=12)	4.39	5.61	5.00
Control Group	(n=12)	5.33	6.22	5.78

Stat. Significance:

1. Pooled: (all d.f. = 22) F.B. Only Small F $<$ F.B. Large F
   $p < .05$ ($t = 2.13$)

   $<$ Young Small F
   N.S. ($t = .470$)

   $<$ Young Large F
   $p < .05$ ($t = 2.08$)

   $<$ 2nd, 3rd Large F
   N.S. ($t = 1.39$)

   $<$ 4th + Large F
   $p < .05$ ($t = 2.12$)

   $\leq$ 2nd Small F
   N.S. ($t = .810$)

   $<$ Control
   N.S. ($t = 2.04$)

   $<$ All pooled
   N.S. ($t = 1.77$

2. Sex differences within groups: (d.f. = 10)

In all groups males $\leq$ females. No differences are significant.

3. Sex differences between groups : (d.f. = 10)

No systematic analysis

(2 tail-tests)

In no cases, however, are the differences significant, on two tail tests.

No systematic analysis of sex differences between groups was attempted. It can be seen from the data, that some of the intergroup sex differences are comparatively large. Thus e.g. first born females from a large family take more risk than first born males from a small family ($t = 2.56$ $p = < .05$ 2 tail). Further analysis of this type was not attempted as it was not felt to be of theoretical importance in the present study[1].

Table 11 and Figure IV present data relevant to the variable of family size per se. These results support hypothesis two, as subjects from small families are shown to accept less risk than subjects from large families ($p < .05$).

Again it is possible to examine sex differences in this instance within family size groups. In both cases a strong trend exists with males accepting less risk than females. In neither case does the difference reach the pre-set acceptance level of significance, but in both cases it is close

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[1] A further caution should be noted in analysing the sex differences from Table 10. Each cell contains six subjects which is insufficient size to allow confident interpretation.

Table 11

Individual Risk Taking - Family Size Groups

$\bar{X}$ of T_{1-3}

	Male	Female	Pooled
Small Family (< 4 sibs.) (n=36)	4.35	5.30	4.72
Large Family (> 3 sibs.) (n=48)	5.36	6.44	5.90
Control (n=12)	5.33	6.22	5.78)

Stat. Sig.

1. Pooled:

Small < Large $.01 < p < .025$ ($t = 2.65$ d.f. 82)

2. Sex Diffs. within Groups:

Male Small < Female Small N.S. ($t = 1.67$ d.f. 34)

Male Large < Female Large N.S. ($t = 1.69$ d.f. 34)

3. Sex diffs. between Groups:

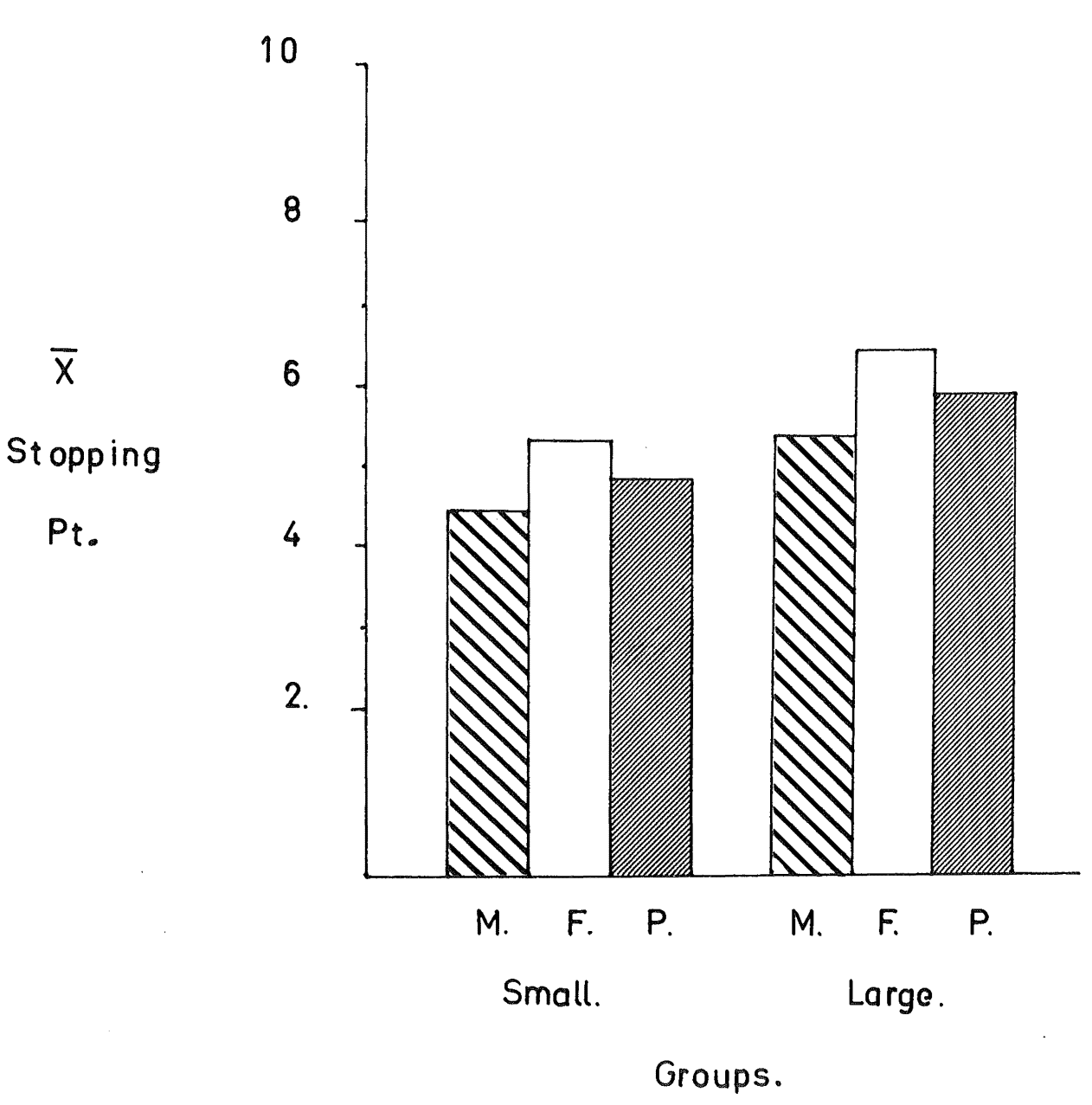
Male Small < Female Large $p < .01$ ($t = 3.52$ d.f. 40)

Male Large > Female Small N.S. by inspection.

(2 tail tests)

Fig. IV.

Risk Taking. Family Size Groups.



to a $p = .10$ level, with 34 d.f. on a two-tail test.

Sex differences between groups can be compared. A comparison of male subjects from large families and female subjects from small families reveals a reversal in the previous trend with males accepting more risk than females, but the difference is not significant. However a comparison of males from small families and females from large families reveals a large and statistically significant result - males from small families accept less risk than females from large families ($p < .01$ $t = 3.52$ d.f. 40).

The final comparison for risk taking results was made between sexes regardless of birth-order. These data are presented in Table 12 and Figure V. As can be seen from this table, the two groups do differ significantly in their acceptance of risk, with male subjects accepting less risk than female subjects ($p < .05$ $t = 2.26$ d.f. = 94) and so hypothesis three is accepted.

The individual risk taking results presented, allow hypotheses two and three to be accepted at the .05 level. Subjects from small families accept less risk than subjects from large families; male subjects accept less risk than

Table 12

Individual Risk Taking - Pooled Sex Differences

	$\bar{X}$ of $T_1 - 3$
Male (n = 48)	4.98
Female (n = 48)	5.91

Stat. Sig.

Males Females $p < .05$ ($t = 2.26$ d.f. = 94)

(2 tail test)

female subjects. Hypothesis one is rejected and the null hypothesis is accepted, as first born subjects do not differ significantly from later borns in their acceptance of risk.

4. Conformity:

Results presented in Table 13 and Figure VI record the mean total deviations from the set norms for the major birth-order groups, with probability values, derived from the application of Mann-Whitney U tests.

From this data, it can be concluded that first born subjects deviate less from hypothetical groups norms, i.e.

Fig. V.

Risk Taking. Sex Differences - Pooled.

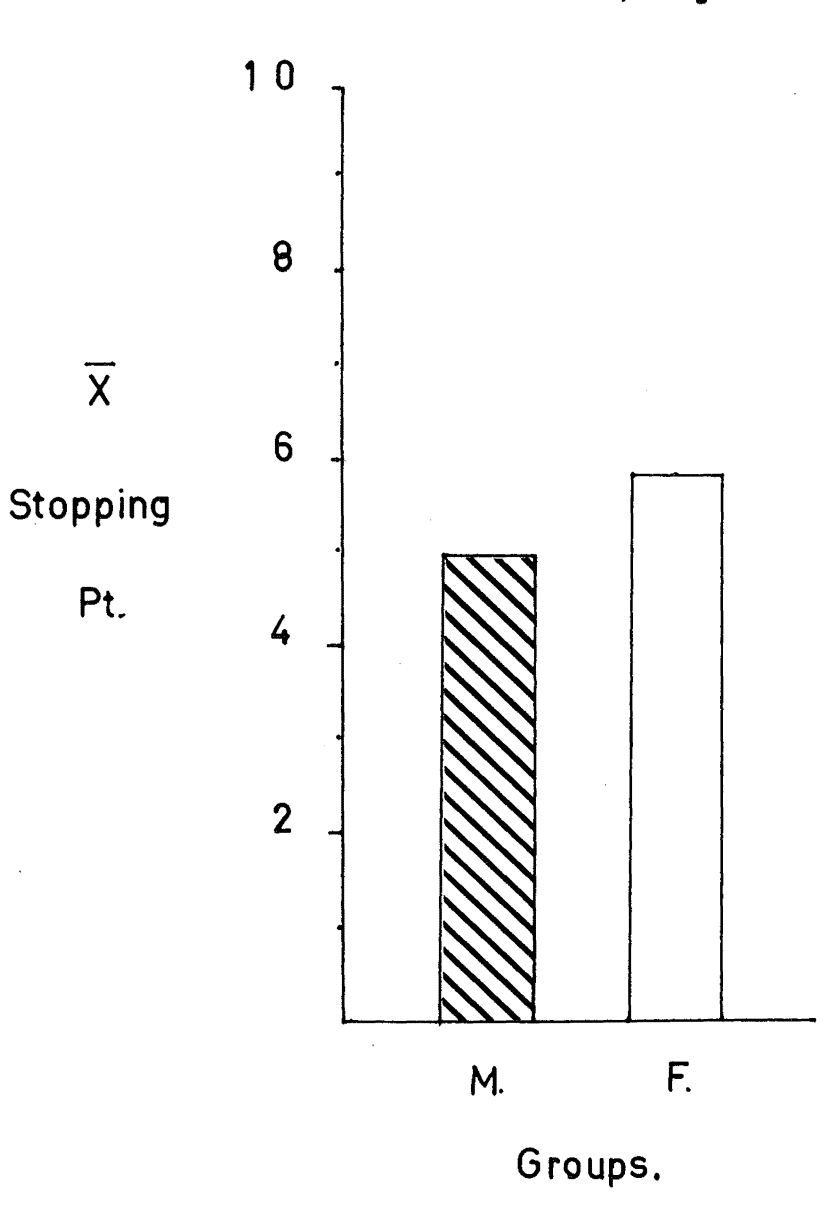


Table 13

Conformity - Major Birth-Order Groups

$\overline{X}$ Total Deviations T_{4-6}

	Male	Female	Pooled
First Born	5.17	5.50	5.33
Later Born	7.03	7.03	7.03

Stat. Sig.

1. Pooled;

First borns deviate less than later borns. $p = .0348$[1] ($U = 931$ $Z = 2.105$)

2. Group Diffs. By Sex:

a. First born males deviate less than later born males

N.S. ($U = 236.5$ $Z = 1.57$ $n_1 = 12$ $n_2 = 30$)

b. First born females deviate less than later born females

N.S. ($U = 228.5$ $Z = 1.35$ $n_1 = 12$ $n_2 = 30$)

3. Sex Diffs. Within Groups:

a. First born males deviate less than first born females

N.S. ($U = 65.5$ $n_1 = 12$ $n_2 = 12$)

b. There is no difference in deviation between later born males and later born females

4. Sex Diffs. Between Groups:

a. First born males deviate less than later born females

N.S. $p = .1286$ ($U = 233$ $Z = 1.52$ $n_1 = 12$ $n_2 = 30$)

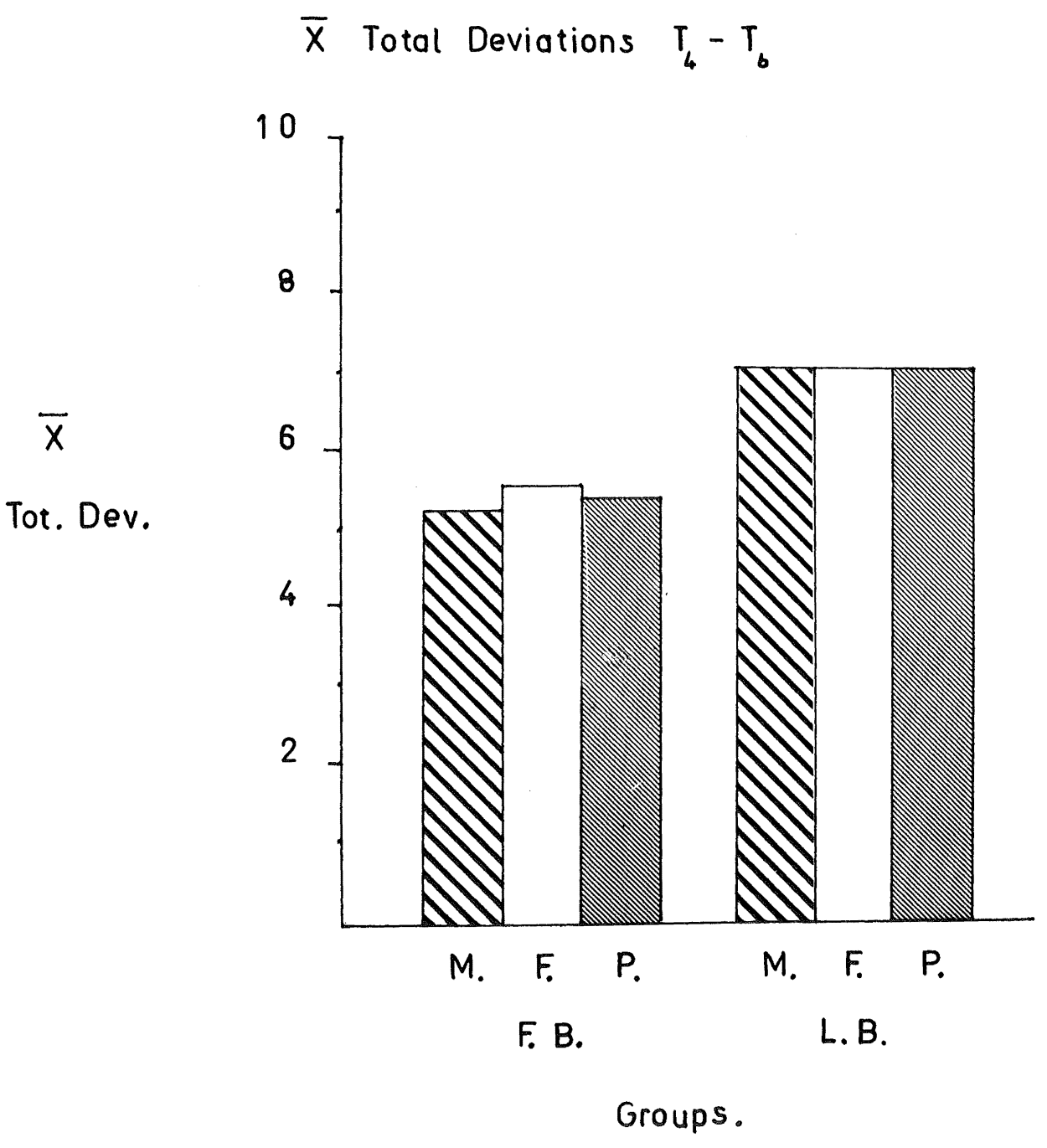
b. First born females deviate less than later born males

N.S. $p = .1260$ ($U = 233$ $Z = 1.53$ $n_1 = 12$ $n_2 = 30$)

(2 tail tests)

[1]For conformity comparisons, the control group is not included and so in each case the $N = 84$.

Conformity. Major Birth Order Groups.



conform more, than later borns ($p = .0348$). This result allows hypothesis four to be accepted. This trend is found in both sex groups in the same direction - i.e. both male and female first born groups conform more than the same-sex later born group, but these two differences do not reach the pre-set significance level.

The table also permits sex differences within groups to be investigated. For later borns there is no difference, but for the first born group, males conform more than do female subjects, although the U value does not approach statistical significance.

Sex differences can also be compared across groups. The results indicate a tendency for first born males to conform more than later born females and first born females to conform more than later born males. Again the acceptable significance level is not reached, but consistent trends are indicated.

A crude measure of conformity behaviour can be derived from the risk taking scores in the conformity condition, and this is presented in Table 14. This presents the numbers and proportions of subjects in both major groups, having a

Table 14

Conformity - Response Profiles for

$T_4 - 6$

Where $N_3 < N_5 < N_8$

		No. of subjects	Proportion
First Born	(n = 24)	11	.458
Later Born	(n = 60)	18	.300
Total	(n = 84)	29	.345

response profile, where the risk taking response on the norm three trial was less than the response for the norm five trial, which in turn was less than that for the norm eight trial. This index of risk taking in the conformity condition, also indicates that first born subjects conformed more than later born subjects. The total proportion of subjects who show conformity on this index is .345, which is close to the 32 percent of subjects who yielded in Asch's (1952) study.

Table 15 presents results of the conformity behaviour of the Birth-Order - Family Size groups.

These results show that the first born subjects from a small family conformed more than did subjects from other

Table 15

Conformity - Birth Order - Family Size Groups

$\bar{X}$ Total Deviations T_{4-6}

	Male	Female	Pooled
F.B./Only Small family	4.50	2.50	3.50
F.B. Large Family	5.83	8.50	7.16
Youngest Small Family	5.66	6.50	6.08
Youngest Large Family	8.00	8.00	8.00
2nd & 3rd Large Family	8.00	7.17	7.58
4th and Later Large Family	6.33	6.00	6.17
2nd Small Family	7.17	7.50	7.33

(All n = 12)

Stat. Sig.

1. Pooled:

First Born/Only Small $<$ F.B. Large F $p < .02$ ($U = 30.0$)

$<$ Young Large F $p < .02$ ($U = 24.5$)

$<$ Young Small F $p < .05$ ($U = 35.5$)

$<$ 2nd & 3rd Large F $p < .02$ ($U = 26$)

$<$ 4th plus Large F $p < .05$ ($U = 35$)

$<$ 2nd Small F $p < .02$ ($U = 26$)

(All $n_1 = 12$ $n_2 = 12$)

All other differences are not significant.

Sex Diffs. Between Groups:

No systematic analysis.

birth order family size groups. In each case the differences were significant on 2 tail tests. No within groups sex differences were significant, and the direction of the differences varied. Three of the groups, first born small family, 2nd and 3rd large family, and 4th and later in a large family, gave results with females conforming more than males. In a fourth group, youngest from a large family, there was no difference and in the remaing three males conformed more than females. No systematic analysis of the between groups sex differences was undertaken because of the small sample size in each sub group and the theoretical insignificance of such an analysis, although an inspection of the data reveals that some of these differences are comparatively large.

The earlier response profile table is presented again in Table 16, this time with results by birth-order - family size groups. This index again supports the deviation measures of conformity by indicating that the proportion of subjects from the first born small family group who had the correctly ordered response profile was greater than for any other group.

Table 16

Conformity - Response Profiles for T_{4-6}

Where $N_3 < N_5 < N_8$

	No. of Subjects	Proportion
F.B. Small Family	7	.58
F.B. Large Family	4	.33
Young Small Family	4	.33
Young Large Family	3	.25
2nd & 3rd Large Family	3	.25
4th + Large Family	5	.42
2nd Small Family	3	.25

(All n = 12)

The next comparison of conformity results examines family size as a variable, for which the relevant data are presented in Table 17. The difference between the pooled scores of the two groups just reaches the alpha level of significance, with subjects from small families showing more conformity to group norms than subjects from large. This

Table 17

Conformity - Family Size Groups

$\bar{X}$ Total Deviations T_{4-6}

	Male	Female	Pooled
Small Family	5.77	5.50	5.63
Large Family	7.04	7.42	7.29

Stat. Sig.

1. Pooled: (n_1 = 36 n_2 = 48)

   Small Family < Large Family p = .05 (U = 1079.5 Z = 1.963)

2. Group Diffs. by Sex: (n_1 = 18 n_2 = 24)

a. Males Small Family < Males Large Family

   N.S. (p = .280 U = 285 Z = 1.08)

b. Females Small Family < Females Large Family

   N.S. (p = .0512 U = 291.5 Z = 1.95)

3. Sex Diffs. within Groups: (Small F. n = 36 Large F n = 48)

   No significant differences

4. Sex Diffs. between Groups: (n_1 = 18 n_2 = 24)

a. Males from Small Family < Females Large Family

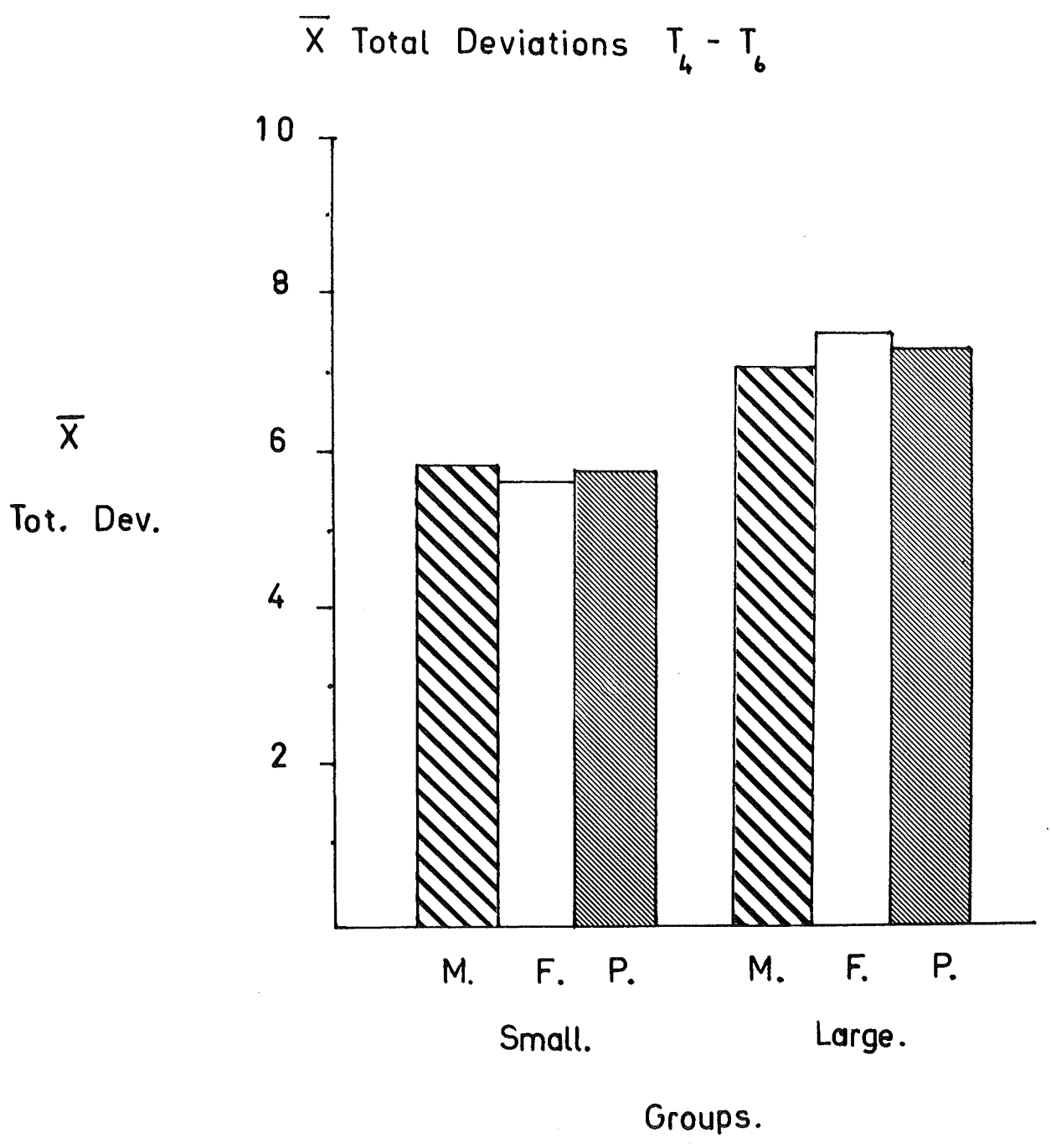
   (p = .234 U = 262.4 Z = 1.19)

b. Females from Small Family < Males Large Family

   N.S. (p = .0514 U = 291.5 Z = 1.94)

(2 Tail tests)

Conformity. Family Size Groups.



allows hypothesis five to be accepted at the .05 level. These group differences are still apparent when the four sex sub groups are compared. Males from a small family conform more than males from a large family, and females from a small family similarly conform more than females from a large family. In both instances the differences are not significant, although in the latter case the level is close to alpha ($p = .0512$). A comparison of the sex differences within groups reveals none which are significant. In small families, males conform less than females while this slight difference is reversed in the large family. The results of a sex difference between groups comparison again points to the importance of the family size variable. Strong trends indicate that males from a small family conform more than females from a large family while females from a small family conform more than males from a large family. Again, neither result is statistically significant although the latter difference is close to the criterion ($p = .0514$).

The final comparison of conformity results is of sex groups regardless of birth-order. These results are presented in Table 18 and Figure VIII. On the experimental

Table 18

Conformity - Pooled Sex Differences

	$\bar{X}$ Total Deviations $T_4 - 6$
Male (n = 42)	6.50
Female (n = 42)	6.59

Stat. Sig:

Males < Females (N.S. by inspection)

index, males conform more than females, but the difference is small. This causes hypothesis six to be rejected, and the null hypothesis is accepted.

In summary, the conformity results allow hypotheses four and five to be accepted at the .05 level. First born subjects conform more than later born, and subjects from small families conform more than those from large families. Hypothesis six is rejected and the null hypothesis accepted. Male and female subjects do not differ in their conformity to group norms.

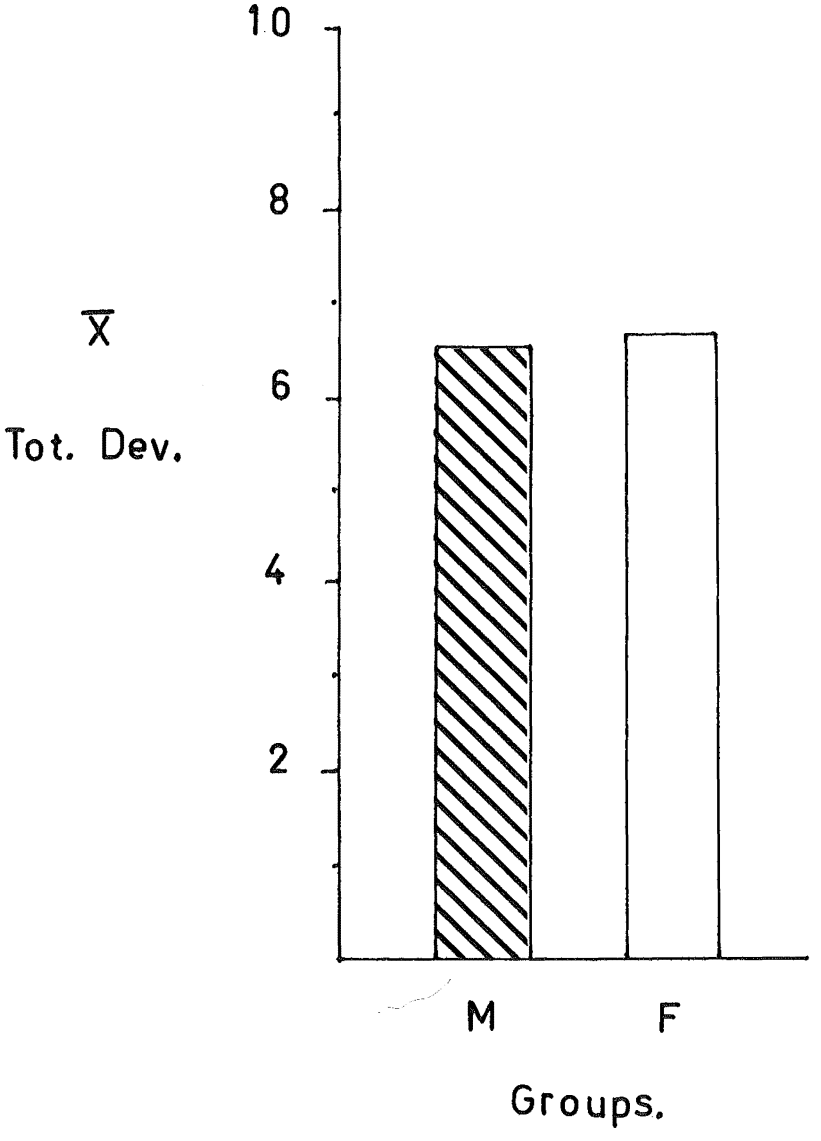
5. Confidence Ratings

It was expected that the control and experimental

Fig. VIII.

Conformity. Sex Differences - Pooled.

X Total Deviations. $T_4 - T_6$



groups should differ in changes of confidence on the rating scale administered prior to and following upon the conformity trials. The control group should decrease their rating of confidence as the experiment progressed due to feedback of performance being largely negative, e.g. a loss on Trial 5A, and the absence of normative information to serve as an anchor. It was anticipated that the experimental groups would increase their ratings of confidence as a result of being given normative information. The relevant data are presented in Table 19.

Table 19

Control-Exp. $\bar{X}$ Confidence Rating on 5 point Scale
1 (Impossible) to 5 (Certain)

	$\bar{X}$ Rating Post T_{3A}	$\bar{X}$ Rating Post T_6	$\bar{X}$ Diff.
Control ($n = 12$)	3.67	3.08	-.59
Exp. Groups ($n = 84$)	3.06	3.49	+.43

Stat. Sig.

Control T_{3A} — Control T_6 $t = 2.024$ ($p < .05$ 1 tail)

Exp. T_{3A} — Exp. T_6 $t = 4.196$ ($p < .0005$ 1 tail)

(1 tail t, where $t = \dfrac{\bar{d}_2}{\sqrt{\dfrac{s^2_d}{n-1}}}$ $n - 1$ d.f.)

Controls do decrease in their confidence ratings and experimental groups increase as predicted, the differences being significant. A caution is needed however, as the two groups are not initially equal in their ratings of confidence following the initial trials. For this reason it is difficult to interpret the results presented in Table 18 with any confidence.

It was also anticipated that the birth-order groups would differ on the initial rating, the second rating and the amount of change which occurred. Table 20 records the relevant date.

Table 20

Birth Order X Confidence Rating on 5 point Scale
1 (Impossible) to 5 (Certain)

	$\bar{X}$ Rating Post T_{3A}	$\bar{X}$ Rating Post T_6	$\bar{X}$ Diff.
First Borns (n = 24)	2.96	3.46	(.50)
Later Borns (n = 60)	3.10	3.50	(.40)

Stat. Sig.

F.B.$_{T_{3A}}$ — F.B.$_{T_6}$ $t = 2.40$ ($p < .025$ 23 d.f.)

L.B.$_{T_{3A}}$ — L.B.$_{T_6}$ $t = 3.29$ ($p < .005$ 59 d.f.)

(1 tail test)

As was expected the two groups differ on the initial rating with first borns exhibiting less confidence than later borns, but this difference is not significant. Both groups have increased their confidence ratings from the first to the second presentation ($p < .025$ and $p < .005$), with the first borns increasing their confidence slightly more than the later borns.

Table 21 presents a similar pattern when family size groups are compared. Again the initial differences are not significant. Both groups increase their ratings of confidence, with the slightly larger increase occurring for subjects from a small family.

Table 21

Family Size - $\bar{X}$ Confidence Ratings on 5 point Scale
1 (Impossible to 5 (Certain)

	$\bar{X}$ Rating Post T_{3A}	$\bar{X}$ Rating Post T_6	$\bar{X}$ Diff.
Small Family ($n = 36$)	3.03	3.53	(.50)
Large Family ($n = 49$)	3.08	3.46	(.30)

Stat. Sig.

Small Fam.$_{T_{3A}}$ —	Small Fam.$_{T_6}$	$t = 2.17$ ($p < .025$, 35 d.f.)
Large Fam.$_{T_{3A}}$ —	Large Fam.$_{T_6}$	$t = 2.64$ ($p < .01$ 47 d.f.)

(1 tail test)

These results of the confidence ratings tend to add tentative support to the experimental results already presented, but this support is subject to the limitation mentioned. The validity of these results will be criticised further in the subsequent chapter.

6. Additional Results:

From the group matching data collected prior to the experiment, and those which emerged subsequently, as results, it is possible to examine some further relationships. These additional results are based on individual subjects and are correlational, and so no causal relationship is inferred. However in many cases it was found that variable X was associated with variable Y at a statistically significant level. The results which are summarized in Table 22, are those which are of some import to this study or are relevant to associated issues in the ordinal position literature. With one exception, they are derived from product-moments.

The results show that as measured intelligence increases individual risk taking behaviour decreases, and this

Table 22

Correlation Table

	I.Q.	Occupational Status	Risk Taking	Family Size	Absolute Ordinal Position	Deviation from Norms
I.Q.	-		-.23*	-.08	-.25**	-.16
Occup. Status			-.12[1]			
Risk Taking			-	.40***	.21*	.15
Family Size				-	(.75)***[2]	.09
Absol. Ord. Pos.					-	.42***
Deviation from Norms						-

Stat. Sig. (2 tail $t = r_s\sqrt{\frac{(N-2)}{1-r_s^2}}$

* - p .05

** - p .02

*** - p .001

[1]Rank Order Correlation. All others Product Moment.

[2]Derived to enable the working of partial correlations

association is significant at beyond the .05 level. Partial correlations (McNemar 1962)[1], were derived to partial out effects of family size, and absolute ordinal position. With family size partialled out, the correlation between measured intelligence and individual risk-taking is -.25 ($p < .02$ $t = 2.48$). When the effect of absolute ordinal position is partialled out, the correlation falls to -.19 ($p < .10$ $t = 1.87$).

Intelligence measured by the A.C.E.R. Intermediate D also shows a negative association with the other major dependent variable - total deviation from the norms. As intelligence increases conformity behaviour also increases, but this relationship is not significant ($t = 1.47$ d.f. = 82). Partial correlations, which account for the effects of family size, previous risk taking behaviour in the early section of the experiment, and absolute ordinal position, still leave the correlation as negative and not

---

[1]

$$r_{12.3} = \frac{r_{12} - r_{13}r_{23}}{\sqrt{1 - r^2_{13}}\sqrt{1 - r^2_{23}}} \qquad t = \frac{r_{12.3}}{\sqrt{\frac{1 - r^2_{12.3}}{N - 3}}} \quad \text{d.f.} = N-3$$

significant. With family size constant, r = -.15 (t = 1.39); with risk taking constant r = -.13 (t = 1.18); and with absolute ordinal position constant, r = -.06 (t = .557).

Measured intelligence is also negatively correlated with subject's family size and absolute ordinal position. As size of the subjects' families increases, measured intelligence quotients decrease, r = -.08 but this relationship is not significant (t = .80). As the number of the subject's position in birth-order rises, measured intelligence falls, r = -.25 ($p < .02$ t = 2.504).

The experimental results have indicated that the grouped family size variable is highly related to risk taking behaviour. As Table 22 shows, the relationship holds in the individual comparison situation. As the subjects' family sizes increase, so too do the amounts of risk they are prepared to accept, r = .40 ($p < .001$ t = 4.23). With measured intelligence controlled, the partial correlation coefficient is .39, which remains significant at the .001 level. This same level of significance is maintained when absolute ordinal position is controlled, the partial

correlation co-efficient = .38

A positive relationship is also shown in Table 22, between absolute ordinal position and risk taking. The higher the subjects position number, the more risk is accepted, with $r = .21$ ($p < .05$ $t = 2.05$).

Finally risk taking is seen to be positively related to deviation from the norms with $r = .15$, but this relationship is not significant ($t = 1.37$).

The relationship between family size and deviation from the norms is positive, but the association does not reach the .05 level of significance

The final product moment relationship is between absolute ordinal position and deviation from the norms. As the birth-order position number rises, the amount of deviation also increases with $r = .42$ ($p < .001$ $t = 4.16$). This relationship remains significant, when partial correlations for intelligence give $r = .40$ ($p < .001$ $t = 3.93$) for risk taking give $r = .41$ ($p < .001$ $t = 4.05$) and family size give $r = .54$.

One rank-order correlation is presented. This gives a negative correlation of $r = -.12$ between occupational

status and risk taking behaviour, i.e. risk acceptance decreases as the occupational status of the subject's father rises. This relationship is not significant ($t = 1.18$).

These correlational results are presented as offering support for the experimental findings or raising problems for discussion in the following chapter.

Summary:

Results of the experimental study are presented. When analysed by t tests, the results show no significant learning effect operating. The manipulation of the conformity variable is shown to have a significant effect when control and experimental groups are compared. The major results offer support for hypotheses two, three, four and five but hypotheses one and six are rejected. For both experimental conditions, birth order family size, and sex differences are subjected to further analysis. Analysis of confidence ratings reveals significant differences between groups, but these are subject to interpretive ambiguities. Additional correlational data are presented which are relevant to the study.

CHAPTER 9

Discussion of Results

The results presented in the preceding chapter support four of the six hypotheses at a statistically significant level (.05). In this chapter the results will be discussed, in order to assess their psychological significance and limitations.

1. The Experimental Measures

The results indicate that the measures chosen were satisfactory. Risk taking was measured by the mean response over trials one to three. As Table seven indicated, these were of low variability and so the choice of a single measure here seems valid. Although it must be conceded that some intra subject variability was found, as the Appendix E shows, the majority of subjects varied only + or - 1.5 from their mean scores.

The conformity measure took no account of direction, as it was the total deviation of the subject's responses from the norms over trials four to six. Again this seems to have been adequate as little information appears to have been lost by not including details of the direction of deviation in the measure of the dependent variable. With

the exception of two groups the mean total deviations over three trials ranged from + 2.25 to + 5.50. The first born group from a small family had a mean total deviation when corrected for direction of 0.0, while the only group with a negative resultant was the group of second and third siblings from a large family where the direction deviation mean equalled -0.42. Of more interest is the major birth order comparison. First borns had a directional mean deviation of + 1.9, while for later borns the figure was + 3.3. This result, with first borns conforming more than later borns, is the same as that suggested by a test of hypothesis four in the previous chapter.

The confidence rating scale comprised the third experimental measure. This proved to be the least satisfactory of the three. Problems of interpretation resulting from the non-equality of the control and experimental results have already been referred to. A further problem increases the ambiguity of interpretation. The correct use of even a simple response scale appears to be a difficult cognitive task for children as responses often need clarification by further questioning. It is doubtful whether much reliance

should be placed on the results from this scale, as the experimenter noted that children would give a verbal response which was not supported behaviourally. This finding is consistent with the writer's experience of children responding verbally to what they perceive is adult expectancy in the situation. Yet the results of the scale, when taken in group form do offer some support for the data, and so cannot be completely ignored. Yet the reader may justifiably suggest that such results are considerably contaminated by experimenter effects.

2. Individual Risk Taking Behaviour:

Birth Order

It was expected that the individual risk taking results would show evidence of the ordinal effects which had been found in some dependency linked behaviours. A test of hypothesis one showed that no significant ordinal effects were present in the data, i.e. first borns and later borns did not differ in their risk taking tendencies; a finding which agrees with Walters & Ray (1960) and Gilmore & Zigler (1964) but is at variance with the remaining studies.

Reasons of a post-hoc nature can be advanced for this

failure. It is possible that risk taking as defined in this study is not a dependency-linked behaviour. Again, it is possible that an incorrect link between dependency and risk taking behaviours has been advanced. Thus the person who exhibits greater dependency behaviour may in a risk taking situation, eschew both the risky and conservative extremes as non-optimal and prefer the "rational" strategies of moderate risks and payoffs. Such a relationship is suggested as a possibility by Kogan and Wallach (1964). A third possibility suggests that Schachter's dependency linked behaviours may vary in the extent to which they exhibit the ordinal effect. A fourth possible explanation would suggest that cultural differences between contemporary American and New Zealand cultures accounts for the finding. Finally, disproportionate subject sample representation may have been a factor contributing to the negative finding. Individuals, predisposed to respond in a particular way in a risk taking situation may have been over-represented in either the later born or first born groups.

It is not possible to eliminate these possibilities but

some evidence can help to clarify their relevance. The current experiment was one form of risk taking behaviour, namely a chance situation involving risk of material loss. Such a situation had been shown to be related to dependency behaviour and in the manner presented. However it must be conceded that the ordinal position - dependency behaviours link is more strongly manifest under conditions of stress (Staples and Walters 1961). It therefore is possible, that a risk taking situation making physical risk salient, would show more pronounced birth-order effects than the present study. Such a view would be supported by the multidimensional assumptions of Slovic (1964), and the limited generality of group-individual studies in risk-taking across situations (Marquis 1962, Atthowe 1961, Wallach & Kogan et al. 1962). For these reasons the first alternative cannot be refuted.

The second possibility initially at least seems valid. The alternative link of high dependency - moderate risk seems intuitively reasonable. Kogan and Wallach found such a relationship in skill situations with student subjects. However, it is contended, with some confidence,

that for the subjects, the present study's experimental task was largely a chance situation. It is doubtful whether the cognitive development and gambling sophistry of eleven to twelve year-old children would allow a mini-max strategy of the type which Slovic (1966) suggests will produce optimum results. This would be necessary if the situation was to become skill oriented. Furthermore, if it is accepted that the assumption of birth-order differences in dependency behaviour is tenable, then first born subjects in the experiment should take moderate risks while later borns should take extreme risks. Relevant data from the present study are presented in Table 23.

Table 23

Pattern of Risk Taking Responses T_{1-3}
$\bar{X}$ Total No. of Responses at Each Switch

	Switches										
	0	1	2	3	4	5	6	7	8	9	10
F.B.	0	0	4	5	7.5	4	6	1	3	4	1.5
L.B.	.4	.6	3.4	3.6	6.5	4.4	5.0	3.6	3.0	4.2	1.2
Control	0	0	2	3	6	7	4	3	9	1	1

This table indicates that both first born and later borns prefer moderate to extreme risk, and they do not differ in

extreme behaviours, to any marked degree. For the alternative relationship of dependency and risk taking to hold, it would be expected that the first borns results would be a U function while later borns would produce an inverted U function. Thus, it can be stated with some confidence, that the earlier suggested negative relationship between dependency and risk taking has not been disproven by the results presented.

The third possibility suggests that risk taking, even if dependency linked, may not exhibit the phenomenon which Schachter optimistically predicted for such behaviours. Initially at least, it must be conceded that the results suggest such an interpretation. Yet the subsequent analysis, which examines the effects of birth order after family size is separated out, reveals that ordinal position does mediate risk taking behaviour. As Table ten shows, first borns from a small family do accept less risk than do other groups of ordinal positions and family sizes. The trend is consistent, in three cases is significant, even with the small group sizes (n = 12) and approaches the alpha level in two other comparisons. Therefore, tentatively, it can be argued

that the results do show that risk taking is related to birth-order, but that this relationship is tenuous and is mediated or even obscured by the contextual variable of family size.

The fourth possible explanation of the lack of major birth-order effects to be suggested was the influence of cultural differences, between subjects on previous studies and the present one. This argument cannot be refuted. It is possible that differences do occur in birth-order relationships with behaviour between cultures. Such differences which are quite critical to ordinal effects, can be seen e.g. in the results of Schachter (1959) and Yoda and Fukatsu (1963). Schachter found first borns to be more affiliative and dependent than later borns, but in the Japanese study dependent behaviour was more typical of second born children, while first borns were found to "shun company." Cultural expectations for first borns in New Zealand society may differ in the emphasis placed upon independence than is the case in contemporary American society. Or it could be argued, that all ordinal positions in this society may be more equally socialized in dependence behaviour than is the case in contemporary American society.

But such reasoning is more speculation and achieves little.

It is also possible that disproportionate subject sample representation was responsible. The results may be due to the over-representation, among either birth-order group, of subjects predisposed to respond in a non-modal form. The data do not allow this criticism to be refuted, but the controls used and the sampling technique adopted appear to have been sufficiently rigorous to lessen such a possibility. The major birth-order comparison was between groups of $n = 24$ and $n = 60$. These are sufficient in size to account for random variance, in terms of a reasonable power level for the tests used, although such an assumption with the smaller group may readily be questioned.

It appears likely then, that the failure of the major birth-order groups to exhibit significant differences in risk taking behaviour is partly a function of the nature of the risk which the task presented, and partly due to the contextual effects of family size not being analysed in this initial comparison. Other possible explanations cannot be completely refuted.

Family Size

Family size has been shown to be of importance as a contextual variable. The results analysed in Table eleven showed that the subject's family size was an important determinant of risk taking behaviour when considered as the major independent variable. This allowed hypothesis two to be accepted at the .025 level. This result is given additional support from the correlation table (Table twenty-two). Here family size is correlated with risk taking at a $p < .001$ level, with $r = .40$. The correlation remains high even when absolute ordinal position and intelligence are partialled out. In terms of this result, and those which will be discussed later, it is reasonable to suggest that family size is important both as a major and a contextual variable a suggestion which agrees with Rosen (1961) and Rosenberg and Sutton-Smith (1964). The writer will return to a full discussion of the family size variable later in the chapter.

Birth-Order : Sex Differences:

The results presented in the previous chapter permit some discussion of birth-order sex interactions.

To generalize, the literature suggests that birth-order and dependent behaviour links differ according to the sex of the subject. (Sampson 1962, Carrigan and Julian 1966). The results of the present study are slightly equivocal. First born males take less risk than later born males but the trend is reversed for females. Thus comparing major birth-order groups, males show larger birth-order differences than females, this finding agreeing with Sampson (1962) although it does not reach statistical significance. Birth-order effects can be seen when family size is added as a contextual variable. Both male and female first borns from small families take less risk than male and female subjects from other sub groups. None of these differences are subjected to significance tests due to the small n, but the trends are consistent. It would appear then that there is a trend in the data suggesting that first born male subjects are consistent in accepting less risk than later born males, but that this relationship holds for female subjects only when family size operates as a contextual variable. This finding supports the studies of Ehrlich (1958), Dittes (1961) Sampson (1962)

Smith and Goodchilds (1963) and Becker et al. (1962, 1964) with regard to male subjects but offers only limited support to findings of birth-order differences among female subjects. (Carrigan & Julian 1966, Arrowood and Amoroso 1966, Staples and Walters 1961 and Haeberle 1957).

Only Carrigan and Julian (1966) compared sex differences within birth-order groups, and their finding contrasts with the present study. The results of Tables nine and ten indicate less risk acceptance by males than females.

Sex Differences:

The final comparison of risk taking behaviours permits a discussion of sex differences, regardless of birth-order. Taken over all groups, the results allow hypothesis three to be accepted, as the differences between the groups are significant at the .05 level. In the study males accepted less risk than females.

While the difference was not unexpected, the direction of this difference came as a surprise. Previous studies in risk taking, with the exception of Tajfel et al. (1964), suggest that male subjects exhibit greater risk taking

behaviour than do female subjects. Tajfel et al., did not find in the opposite direction; their result was one of no difference.

Initially, it seemed plausible that this reversal effect was possibly due to differences in the risk task in this study as compared with those reviewed. As Slovic (1964) has indicated inter-task risk taking reliability is often low. In the studies reviewed, tasks ranged from ratings of playground behaviour (Anastasi, 1958) to achievement under threat of failure (Crandall and Rabson, 1960). Only two studies have tasks which are similar in type to that in the present study. Kass (1964) used slot machines with varying probabilities of payoff and Slovic (1966), a machine and procedure similar to that in the present study. Both found that male subjects preferred to take more risk than did female. Slovic's results can be compared with this writer's results, as some of his subjects were of the age range employed in the present study. Kass's subjects were younger, six to ten years, but he notes no differences between ages.

What can account for the reversal of risk taking

behaviour so that females take more risk than males?

Subject sample variation is one possibility. While Kass may have experienced no age-sex differences in a six to ten years-old range, development theorists e.g. Breckenridge and Vincent (1953) would suggest that the subsequent two years are significant for the rapidity of behavioural changes which occur. Slovic's subjects did exhibit age variations in sex differences and the risk taking behaviour of twelve year-old subjects did not vary significantly between sexes. In addition Slovic's subjects were all volunteers and so it can be assumed, as he notes, that his sample was possibly biased toward risk taking behaviour.

A possible contaminant and one which could have been responsible for the reversal of the sex effect concerns the rewards used and variation in the value of outcomes for the subject (Feather 1959, Slovic et al. 1960). It is possible that these rewards, subjectively preferred sweets, had a differential effect as rewards for boys and girls. If the rewards were more valued by the male subjects it is conceivable that they would be less prepared

to take risks which may have resulted in a loss of winnings. Slovic (1966) used candies and he assumes that they exercise a similar effect for both sexes at a given chronological age. This may not hold when the chronological age is one characterised by extensive sex maturity variation. The earlier onset of adolescence in females could have biased the experimental sex groups used in this study, in that sexes, equated for chronological age, may not have been so with regard to developmental maturity. If this position holds it is not inconceivable that the rewards would be more inhibiting to risk acceptance in males than in females. This idea of earlier female maturity affecting behaviour, is consonant with the theoretical assumptions of Sampson (1962) and Rossi (1965). However this writer suggests that the method of choice of subjects and the method of choice of particular reward varieties lessens the possibility of such a contamination. It is difficult to imagine a procedure which would give subjects rewards of a more equal utility. Research in the industrial sector (Vroom 1964, Shimmin 1964) has repeatedly shown that subjective equality of rewards for performance is an

idealized state which cannot be achieved. The essential task then is to reduce rather than eliminate utility variability.

Sequential reward effects could contribute to the reversal noted. Cohen and Hansel (1956) and Myers and Sadler (1960) have noted the influence of the gambler's fallacy i.e. the non recognition of the independence of events. This is particularly noticable, Cohen claims with subjects under sixteen years of age. Slovic et al. (1965) found no sequential effects with older subjects in a betting task. Unfortunately there are no results which suggest sequential effects operate differentially between sexes. However in terms of Cohen's assumptions with regard to age and the earlier arguments about sex differences in utilities it is not inconceivable that sequential effects are more pronounced for male subjects. Yet an analysis, of the mean response for trial one in the present study reveals that in each group female subjects accepted more risk than males and the mean T_1 stopping points pooled were Male 4.52 and Female 5.96. This is prior to any sequential reinforcement over trials beginning to

operate. However no analysis can reveal whether or not sequential reinforcement effects within trials had an effect.

Possible Contaminating Variables:

In experiments on risk taking behaviour it is possible that uncontrolled variables, or unsuccessful attempts to control variables, may influence results. Some of these will now be examined in the context of this study.

It was suggested to the author by Crowther (1966) that social class would need to be controlled in this study using rewards of this type. Groups were equated on the Congalton and Havighurst Scale (1954) and the residential district chosen was homogeneous in terms of property values. It is possible to examine the relationship of occupational class to risk taking behaviour by reference to Table twenty-two. The correlation between these two variables is -.12 which is not significant. Thus it can be suggested that socio-economic class has had little effect in this situation.

Slovic (1966) has suggested that experimental tasks

of this type have a low cognitive content. If his assumption is correct, then measured intelligence should show very little relationship to risk taking behaviour. This writer suspected that the cognitive content of the task may have been greater than Slovic was prepared to admit, and for this reason the experimental groups were controlled for intelligence measured by the A.C.E.R. Int. Form D. Some empirical weight may be given to these suspicions, as Table twenty-two reveals a significant negative relationship between intelligence and risk taking behaviour ($r = -.23$). The relationship is maintained at a significant level when family size is partialled out ($r = .25$) but falls to a non-significant level when absolute ordinal position is controlled ($r = .19$). This would suggest that even in a chance situation of this type, with young subjects, their is an intellective component in risk taking behaviour. As a consequence, studies involving solely student subjects, a situation typical of many investigations of risk taking behaviour, are of limited generality. Every attempt was made to ensure that all subjects were operationally if not conceptually conversent with probability and the independence

of events as they applied to the study. Obviously there were some individual differences in the degree of understanding in this regard, but this is none the less true of any form of psychological experimentation to some degree. Such a point appears to be advanced by Scodel et al. (1959) in their plea for decision making theorists to give attention to personality correlates of risk taking behaviour. Even then, if individual differences are accepted as being present in this study it is likely that the control of subject groupings for intelligence was sufficient to mitigate against their contaminating the experimental results and interpretation. The advantages of being able to claim greater generality for results obtained from controlled groupings of a heterogeneous population appeared important to this writer.

Studies have suggested that first born children are higher in achievement motivation than later borns. (Sampson 1962, Rosen 1961). If this relationship holds, it is possible that the motivation to achieve could work contrary to the experimentally expected first born behaviour of favouring low risk Achievement motivation theorists have suggested, from Atkinson's (1957) model that high motivation to

achieve is associated with preference for moderate risks whereas low motivation to achieve is associated with extreme risks. The present data do not offer support for the view that achievement motivation as conceptualized by Atkinson et al., has contaminated the individual risk taking responses. The distribution of responses presented in Table twenty-three reveals a slight central tendency for first born subjects, but this is also true of the later born subjects. Furthermore, both groups have a stronger tendency to make risky extreme choices than conservative extreme choices. Such findings are incompatible with possible achievement motivation contamination which is consistent with the Atkinson model. Research support can also be offered. The current study appears to have a predominantly chance content. Studies such as Atkinson et al. (1960) and Littig (1962), which are reviewed by Slovic (1964), suggest that the Atkinson model appears applicable in skill situations involving risk but not on tasks with a high chance content, where very conflicting results have resulted. A similar result was found by Raynor and Smith (1966). This last study also showed that

the relationship of achievement motivation to risk situations was less when the experimental conditions did not attempt to induce a "motivation to achieve" set. As the experimental condition of the present study was also comparatively free of such a motivation set, it is suggested that motivation to achieve was kept to a minimum.

Studies have suggested that risk taking behaviour is a function of whether the decision is individual or group (Wallach & Kogan 1959, Stonner 1961, Marquis 1962). However generality of a finding of increased risk taking as a result of group decision-making is confined to the Wallach and Kogan paper problem risk simulation. The present study uses only an individual measure as the index of risk taking in the experiment and so the results offer no direct comparison with the Wallach and Kogan, Stonner and Marquis findings. However, such a comparison can be made in a re-analysis of the data. Table 24 shows that risk taking increased following information concerning group norms. The mean for all groups pooled for trials one to three was 5.39. This rose to 6.28 for the final session. ($p < .001$). The corresponding figures for the

Table 24

Risk Taking - Behaviour of Experimental Groups

	$\bar{X}$ Stopping Score
Trials 1 - 3 (Individual)	5.39
Trials 4 - 6 (Post Influence)	6.28

(N = 84) $t = 3.86$ $p < .001$ (2 tail with 83 d.f.)

control group were 5.78 and 5.88 and this difference is not significant. This suggests that the present study offers some support for the Wallach and Kogan et al. finding of increased individual risk taking following social influence. This result is not unexpected as the social influence situation here is not face to face as was the case with Lonegran & McClintock (1961) and Hunt & Rowe (1960) who had found no differences between individual and group decisions. Because face to face influence (in which normative pressures per se, may be less salient) was eliminated, it can be asserted with some confidence that the experimental effect of increased risk taking was due to the influence of the hypothetical norms.

The number of strategies adopted by the subjects was

limited. Two appeared to be quite general. In one case after the initial risk point was adopted for trial one, an additional step was taken for each of trials two and three. The second common strategy was to follow the initial choice with one of markedly higher or lower risk and then return to the original choice for trial three. These subjects were responding to the gamblers fallacy by assuming that a red light to one side would be followed by one to the other side of the console. Some individualistic strategies were adopted which approximated Cohen et al.'s (1956) superstition strategy. One subject refused to go past switch three on the grounds that four was his unlucky number when he played euchre with his grandfather.

Within trial strategies varied markedly. Some subjects proceeded with increasing decision times as the risk increased. Another strategy set a given switch as an aim. When this was reached the subject stopped, or showed some evident pleasure and continued to switches eight or nine without any apparent concern. Even less apparent concern was shown by a small group who proceeded rapidly to switch

nine without a pause. The usual decision time was something in the vicinity of 2.5 seconds, but with one subject this rose to as high as 32.3 seconds.

To summarize, the risk taking results offer some support for the assumption that risk taking, as defined in this experiment, exhibits birth-order effects, but only when the variable of family size is controlled. To this very limited extent the phenomenon may be considered as a specific case of the oft-reported birth-order - dependency behaviour link. However the absence of an anxiety condition may have some bearing on the failure of the results to link risk taking behaviour to ordinal position per se. The very marked influence of the family size variable, even in an experiment which induced little or no subjective stress, does suggest that studies which use ecological variables and which ignore family size, may have limited generality. To this degree the results support the assumptions of Rosen (1961) and Rosenberg and Sutton-Smith (1964) and many studies reviewed in Chapter Four.

The reversal in sex differences with previous research results cannot easily be resolved. It appears that this

effect may be due to the separate or interactive effects of sample differences and the sequential effects of intra-trial reinforcement. The possible effect of differing subjective utilities for the rewards materials is discounted.

The controls, results and interpretations from the literature suggest that socio-economic class, cognitive differences among subjects, achievement motivation and other social influences, did not act as contaminating variables.

3. Conformity Behaviour

The results presented in the previous chapter which compared the control and experimental groups, indicated that the manipulation of the independent variable did have an overall difference effect. Furthermore it operated as predicted in influencing judgements so that mean responses to norm three were less than those for norm five which were less than those for norm eight. Later results in Chapter Eight offered support for two of the three conformity hypotheses.

Birth Order:

It was anticipated that the conformity results

would show ordinal effects for the major birth-order groups. This proved to be so. First born subjects conformed more to hypothetical group norms than did later born subjects, and this confirmed the experimental findings of Ehrlich (1958), Staples & Walters (1961), Dittes (1961), Smith and Goodchilds(1963), Arrowood & Amaroso (1966), Carrigan and Julian (1966) and Becker and Carroll (1962). This result has extended the number of experimental situations which can elicit conformity responses by showing significant results on a risk taking task, comparatively unrelated to the typical Wallach and Kogan approach. Furthermore the result extends the generality of the growing research on birth-order and conformity by showing that the relationship holds on an experimental task of a type not previously used in this field.

The results are, however, at variance with the Becker et al. (1964, 1966) findings. If their use of the Deutsch and Gerard (1955) distinction between normative and informational influence, in a birth-order context holds, this present study should have produced no birth-order effects of the type found. In this study the social influence condition was

largely informational, with the normative content less salient in the experimental situation. According to Becker et al., this should have produced greater conformity behaviour in the later born group, who, they suggest respond more to such social pressures. This was not the case, as the first born subjects exhibited greater conformity behaviour. This writer does not dismiss the heuristic value of the Deutsch and Gerard distinction. He does suggest however that no social influence can be a pure type of either (Allen, 1965, Campbell 1961). Furthermore, the Becker et al. manipulations and interpretations are so complex and ambiguous, that they cannot be said to represent the experimental situation with any degree of confidence (c.f. Warren 1966).

The heightened conformity behaviour for first borns is also reflected on another index (Table 14), namely the response profiles of subjects whose judgement on norm three was less than norm five which was less than norm eight. Additional support is offered from the correlation table (Table 22). Ordinal position, removed from group effects, correlates .42 with deviation from norms, i.e. earlier

borns conform more than later borns. This relationship holds under conditions where intelligence is partialled out ($r = .40$) and family size is controlled ($r = .54$).

When the major birth-order groups are divided into the seven experimental birth-order family size groups, a similar picture to the risk taking results emerges. These results show that first borns from a small family conform more than any other birth-order group, and in this case each comparison is significant at greater than the .05 level. Again family size is shown to be functioning as a contextual variable and refines the simple ordinal effect which the results of the major birth-order grouping had indicated. Reference to Table 15 reveals that the differences which were apparent between pooled first borns and later borns are almost solely a function of the results of the first born - small family group. First borns from a large family are much closer in mean deviation scores to the separate later born groups.

Birth-Order Sex Differences

For both male and female subjects, first borns conform more than later born subjects although the

differences are not significant ($p = <.13$). The results are somewhat similar to those presented on individual risk taking although in this instance there is no reversal for first and later born females. The previously noted importance of family size as a contextual variable again is found. First borns of both sexes from small families are more conforming than other sex sub groups. No significance tests were derived due to the small sample size ($n = 6$) but Table 15 indicates that the differences are consistent.

The trend from these results extends that noted with risk taking behaviour. First born males and females are consistently more conforming even when family size is not controlled. However the results are not statistically significant although the results are consistent. This again offers tentative support for the results of Ehrlich (1958) Dittes (1961), Sampson (1962), Smith and Goodchilds(1963), Carrigan & Julian (1966), Arrowood & Amaroso (1966), Staples & Walters (1961) and Haeberle (1957).

The comparison of sex differences within groups reveals no significant differences or consistent trends. This no

difference finding contrasts with the only study to report such differences, Carrigan & Julian (1966), who found that females conformed more than females within birth-order groups.

Family Size:

Family size is shown again to be important as a major independent variable, in the results which permit hypothesis five to be accepted. Subjects from a small family conformed to group norms more than did subjects from a large family and this held for both sexes. (Table 17). This finding offers additional support to the assumption that this variable is one, whose effect should not be ignored in social/developmental psychology experimentation. (Rosen 1961 et al.)

Sex Differences:

The final comparison in conformity behaviour allows a discussion of sex differences in conformity behaviour regardless of birth-order. A no difference result is shown by Table 18 and the null hypothesis is accepted.

The literature reviewed suggests that sex differences

in conformity do present a generally consistent pattern of females conforming more than males. (Crutchfield 1955, Tuddenham 1958, Applezweig & Moeller 1958, Beloff 1958, Iscoe et al. 1963, Reitan & Shaw 1964, and Endler 1966). These results are generally consistent over a variety of experimental situations, although as Blake & Mouton (1961) suggest the differences are usually small. Allen (1965) also suggests that the generalized sex differences are often changed by social or asocial situational variables in the experimental situation. It is therefore not surprising that the present study yielded a no difference finding on sex differences if account is taken of Allen's assertion. Phelps and Meyer (1966) reported no sex differences in their conformity study using a Crutchfield technique.

Is it possible to suggest why the usual sex differences are not seen in these results? One possible post-hoc explanation would suggest [illegible] the differential developmental maturity, postulated in the discussion of the effect of rewards on the risk taking results. Developmental theorists suggest that children approaching adolescence experience ambivalence in situations where independence is salient.

There is behavioural tendency to prefer non-conforming behaviour for the sake of appearing to be independent of authority and yet conforming highly to peer group expectations. It is possible that more girls, being developmentally more mature than boys at this age, met this ambivalence in the experimental situation. The norms were supposedly an implied expectation derived from the peer group, yet the task was performed in a school in front of two authority figures, the experimenter and his assistant.

It is more likely that cultural differences have an effect. Milgram showed conformity responses varied markedly among Norwegian and French student subjects. Most conformity studies in the literature, have been conducted in the United States. In that culture there is a marked cultural expectation of male independence. This is strongly reinforced by that society's schooling system, whereas in this country the school situation tends to socialize by authoritarianism, and to produce conformity. The nature of the socialization, which is modal for New Zealand, could well keep sex differences in conformity behaviour to a minimum, as previous experience for both sexes will have taught the

child that conformity behaviours are positively reinforced.

Rossi (1965) and Kammeyer (1966) have suggested that sex differences occur in the ages at which behavioural responsibilities which lead to independence, are socialized. Typically, these are earlier for females in that they are frequently of a domestic nature.

Finally, the comparative absence of stress in the experimental situation could account for the apparent lessened conformity behaviour by female subjects as compared to earlier results. Darley (1966) has shown that stimuli inducing fear produce heightened conformity behaviour with female subjects. This stress variable is often an unintentional contaminant of a conformity study, as the subject who feels "different" to the reference norm will experience at least some emotional stress when the members of the group are present.

Possible Contaminating Variables:

The literature reviewed in Chapter Two indicated that many variables can have an influence upon conformity behaviour. A brief comment will be made in relation to these.

The influence of task ambiguity was controlled to a degree by having a standardized procedure with questioning during learning. Obviously for some subjects the task was more ambiguous than for others, even if the stimulus ambiguity remained relatively constant. In terms of Weiner et al. (1957) some variance of response uncertainty occurred. This can be seen in the data. Twelve subjects at some stage pulled switch ten in spite of being told that a loss would occur in every trial if the game proceeded. It is not clear whether this was due to response ambiguities or to the usually voiced comment among these subjects that he or she had "forgotten". The level of difficulty (Blake et al. 1957) in the task may have had a differential effect upon conformity behaviour but it is considered that the matching of groups for intelligence would keep this to a minimum.

For all subjects the type of judgement was made to simulate a public one. Each subject expected that his "score in the game" would be made known to others. In addition it was public to the extent that responses were made in the presence of the experimenter and his assistant.

The source of influence had been shown to be an important variable. (Berenda 1950, Blake & Mouton 1961). It is possible that the use of the peer group "most intermediate school children" had a differential effect upon individual subjects. This cannot be refuted but it is reasonable to suggest that this is the most specific single peer reference group to which all of these subjects would refer. Certainly they would all be members of this reference group and the problems of differing strengths of cohesion with such a group are diminished.

Reinforcement it is considered did not contaminate the conformity variable as such, in that the subject was not reinforced for conformity behaviour, but for his performance in the game. To prevent any incidental contamination of this type no verbal reinforcement was used (Endler 1966).

Did the presence of the experimenter or the assistant influence the results? Probably some influence of this type would occur, but unless this is non-random across groups it does not influence the interpretation of the conformity behaviours noted. Some negative evidence can be given

concerning experimenter influence. All subjects were asked during the post experimental session, "What did you think I wanted you to do?" Of the ninety-six subjects, eightynine responded "I don't know" or an equivalent phrase. The remainder suggested some strategy e.g. "stopping near the middle" but in each case when asked "Why do you think I wanted you to do that?" the reply was "I don't know", or "I thought you were kidding."

Related to the previous point is the problem of experimental deception. The literature suggests that little effect is made on conformity behaviour by using correct or hypothetical norms (Goldberg and Rorer 1966) even when those latter standards are markedly distorted (Allen 1966). An additional deception was involved in the experiment, namely the connection of a red light to only switch ten on the critical trials. Did any subject become aware of this? No direct evidence is available but from retrospective comments it appears none did. However it remains a possible contaminating effect which cannot be ignored.

Possible individual differences in intelligence among subjects were largely controlled by matching groups on results

of the A.C.E.R. Int. Form D. As Table 22 indicates the relationship between intelligence and deviation from the norms was $r = -.16$ i.e. that intelligence and conformity were positively related, but at a non-significant level. This finding agrees with Janis et al. (1959) and Carment et al. (1963), although most studies have found a negative relationship between intelligence and conformity, (Crutchfield 1955, Nakamura 1958 and Tuddenham 1959). But as has been suggested, such relationships are dependent on the conformity task involved.

One possible contaminant, as with the individual risk taking measures is the achievement motivation of the subjects. Sampson (1962) had found first borns had a higher need to achieve than later borns and this finding has limited support from Rosen (1961). Krebs (1958) and Samelson (1957) had found that those with high need achievement conform less than those low in need for achievement. These two tendencies could be opposing each other in the present study. If first borns have a higher need to achieve, they may conform less, and this could counter any tendency to exhibit conformity behaviour.

Social expectations support the validity of the Krebs and Samelson position, but it is not unlikely that both pressures do operate for first borns, and the resultant behavioural tendency is task specific. As Hoffman (1953) has suggested, those high in need to achieve may conform in some situations as this may be instrumental in goal achievement. This finding has support from Zajonc and Kishor-Wahi (1961) who found high need for achievement subjects were more sensitive to the instrumental value of conformity. In the present study no achievement measure was made, and it was only as a result of retrospective comments by some subjects later in the experimental period, that it became apparent that achievement motivation could contaminate the conformity results. Some indication of achievement behaviour can be seen in Table 25. It can be seen that there is a tendency for first borns from a small family to stop more often before or equal to a norm, while with the remaining groups apart from the 2nd & 3rd Large Family group, the majority of responses were skewed to the opposite direction. Overall there was a strong tendency to exceed norms, rather than conform to or stop prior to reaching such a position. These results do not support the literature with

regard to birth-order and achievement motivation.

Table 25

No. of Responses > = < Set Norms T_{4-6}

	Greater	Equal	Less
F.B. Small Family	8	14	14
F.B. Large Family	15	8	13
Yng. Small Family	19	7	10
Yng. Large Family	26	2	8
2nd, 3rd Large Family	12	8	16
4th Plus Large Family	22	7	7
2nd Small	25	6	5
Σ =	127	52	73

However, the state of the literature in relation to birth-order, achievement motivation, and conformity presents a tangled mass of conflicting results and no firm conclusions are possible, in interpreting this effect in the present study.

Finally, did the resultsshow evidence of anticonformity behaviour (Krech et al. 1962, Willis & Hollander 1964 and Allen 1965)? Some evidence in the form of an admittedly crude index is available. Eight subjects in all had

response profiles which reversed the expected pattern. Thus their responses to norm three were greater than norm five which were greater than norm eight. In addition, if the above writers' two dimensional conformity concept is adopted, thirty-seven subjects could be said to have exhibited consistent non-conformity behaviour, with responses over trials four to six varying plus or minus one.

To summarize, the conformity results offer some support for the birth-order effects previously noted, but they indicate again the importance of the family size variable in a contextual sense and as a major independent variable. These results give no support to the Becker et al. (1964, 1966) findings with regard to informational and normative influence. Birth-order - sex differences in conformity behaviour are consistent with previous studies which have found first borns to conform more than later borns. The no difference finding with regard to pooled sex differences is not consistent with the generalised trend in the literature, although these studies have generally reported only small differences. The origin of the no difference finding cannot easily be defined but it is suggested that this is a function of differential maturity,

cultural differences, experimental variation from previous studies. The influence of possible contaminating variables is largely discounted due to the controls exercised. However the influence of the experimenter, the use of experimental deception and the possible presence of achievement motivation factors cannot be ignored.

4. Confidence Ratings:

The results derived from the application of the confidence ratings must be treated with caution due to the limitations already noted. As they stand they are consistent with the experimental results when groups are compared. Individual inconsistencies and the need to clarify many of the subjects' responses make confident interpretation impossible.

It can be seen from Table 19 that the control and the experimental groups differed appreciably on the initial confidence rating, following Trial 3A. This can be assumed to have been due to subject bias of some variety, probably operating in the control group which had n = 12 subjects.

The difference in the initial ratings of confidence of first and later borns is in the predicted direction although

it is not significant. If the Schachterian dependency - birth-order link holds, one would expect that in an individual situation, with other factors held constant, first borns would exhibit and report less confidence.

The increase in confidence from the first to the second applications of the scale can be attributed largely to the normative information. Although later born subjects gave less evidence of a behavioural response to the norms, it is likely that they did serve as reference points for judgements, and retrospective comments support this.

5. Additional Results:

From the correlational results presented in Table 22 a few points arise which are worthy of additional discussion.

The significant relationship between risk taking and intelligence suggests that studies in this field will need to control subjects for intellective differences.

The relationship of intelligence to absolute ordinal position is interesting. In this study the relationship was $r = -.25$, - as birth-order position number increases, intelligence decreases ($p < .02$). However the author warns that such a result based on $N = 96$ subjects is very

susceptible to sample bias, and prefers to place more reliance on Schoonover (1959) and Chopra's (1966) no difference finding in a study of 1359 children. The slight negative relationship between intelligence and family size is in agreement with Chopra (1966), Jenkins & Randall (1948) and Damrin (1949). No causal relationship is attributed here, because the relationship between these variables may often be a resultant of other factors.

6. Risk Taking and Conformity Compared;

Conformity behaviour, as operationally measured in this experiment has been shown to be subject to ordinal differences, and offers support for early studies in this field. It was expected that individual risk taking, as such, should also exhibit the usual birth-order differences. This in fact occurred but only when the birth order groups were subdivided into small and large family groups. These results would suggest that of the two operational measures used, conformity contained a higher dependency component than did risk taking. In Schachter's terms, it is perhaps more closely linked to dependency behaviours and therefore it would not be surprising when the previous

literature is considered, that the ordinal effect should be more strongly manifested with the conformity measures.

The derived correlation co-efficient between performance on the two dependent variables was .15. This is low. It appears then that subjects who were high risk takers were not necessarily those who were the non-conformers. This would also suggest that marked behavioural differences occurred within the experimental groups, and the results presented in Appendix E appear to substantiate such a conclusion. It is possible therefore, indeed probable, that the observed effects are not predominantly determined by the ecological variables studied. It is conceivable that these differentially influence pre-existing differences. Something of the sort seems to be advanced by Glass et al. (1963) and Rosen (1961) who remarks in a sociological vein.

> "It is not very helpful in predicting an individual's achievement motivation to know his position in the birth-order.....unless the social class and size of his family of orientation are also known."

Something of this nature may also hold for psychological variables relating to personality constructs. However until birth-order analysis is undertaken on a sufficiently large population to allow estimates of the strength and frequency of dependency behaviour in various birth-order groups, the preceding arguments must remain mere speculation.

The major similarity in the results of the two dependent variables concerns the influence of family size as both a contextual and independent variable. Following the literature reviewed and the re-analysis of the Schachterian studies this result was not unexpected. The effect which family size had on the variables concerned, indicates not only that ecological studies must control for its effects, (Rosen 1961, Rosenberg and Sutton-Smith 1964), but also that studies from other fields should control for possible effects in the technique of subject sampling adopted.

The performances of the birth-order - family size groups on the two major variables substantiates the arguments previously stated. The marked difference of the

first born group from a small family illustrates the contextual effect of these two independent variables. No remaining sub group exhibits such consistent behaviour when compared to the performances of the other groups. The only groups which approximate consistency are the group youngest in a small family who were also low risk takers and high conformers, and the first borns of a large family who were high risk takers and low conformers.

Theoretical Explanations: A Reconsideration:-

Do the results of this present study indicate a need for a revision of the theories concerning the origins of birth-order effects?

Sears et al. (1953 and 1957) and Whiting and Child (1953) contend that observed ordinal differences in behaviours are causally related to child-rearing practices and this was the position adopted by Schachter (1959). They see the effects arising in the comparative behavioural inconsistency of initial parenthood promoting heightened dependence in the first born. The results of the present study, indicate nothing to detract from this theorising.

Birth-order effects were noted, particularly in relation to conformity behaviour. The operation of the family size variable can be interpreted as indicating that subjects from smaller families show increased dependency linked behaviours compared to subjects from larger families. This result also fits the theoretical background. While initially, dependent behaviour in the child may be caused by inconsistent mothering, in its later stages, it is maintained by reinforcement responses from the parent to the attention-seeking stimuli. It appears reasonable to assume that in a small family any given child receives a greater proportion of a particular parent's responses to attention seeking stimuli. In a large family the initial dependency behaviour may become decreasingly reinforced or even negatively reinforced until some extinction of attention seeking responses occurs. For later borns in the small family dependency behaviour can develop, either by trial and error behaviour, or learning from the vicarious reinforcement of responses of older siblings, those which are instrumental for goal achievement. This line of reasoning is consistent with Walters and Parke

(1964) who see birth-order phenomena arising from a process of cue association with habits of attending and orienting to others. For the larger family independent behaviour may be the type which is regularly reinforced and this would promote lessened dependency behaviour in first and later borns. Particularly, it may be argued, is this likely to be true of the first born female child who will increasingly share domestic responsibilities. Such a line of theorizing is consistent with the position adopted by Rossi (1965) and Kammeyer (1966).

Schachter (1959) and Irish (1964) also give some importance to the role of sibling interaction in producing birth-order effects. Again the results of the present study do not oppose this theoretical position. Schachter suggests that for the later born, dependency responses are seen as threatening in the sibling interaction situation. It is probable that within the larger family, the age difference between siblings is less than that in smaller families. For this reason, in terms of Schachter's assumption, the older sibling, being closer in age may pose less of a physical threat in the sibling interaction situation.

The theoretical argument which is outlined is consistent with the Rosenberg and Sutton-Smith reinforcement model presented earlier. In their terms there are characteristics of the smaller family which permit primary, secondary and vicarious reinforcement of dependency behaviour, which are not present to the same degree in the larger family.

In terms then of the theoretical background presented in Chapter One, the results of the present study appear congruent. This writer acknowledges that the argument is largely speculative in outline but it does link within a reasonably cohesive framework, experimental results and experimentally based theory.

Summary:

Discussion of results presented in the previous chapter tentatively suggests that risk taking deserves attention as a possible dependency linked behaviour exhibiting birth-order effects. In the current study the link is established only when the contextual variable of family size is added. The results from the conformity analysis are considered sufficient to support earlier studies which have linked this variable to birth-order effects. The operation of family size per se is shown to be a major factor in the study and it is suggested that this variable is deserving of greater research attention. The results of the sex differences comparisons are seen as equivocal and post-hoc discussion attempts to reconcile these difficulties. The results of the two major dependent variables are compared and contrasted and a final consideration is given to the theoretical rationale which underlies birth-order studies.

CHAPTER 10

Conclusions and Implications

The major finding from the present study suggests the importance of family size as a variable in psychological research which deals with ecological variables. Other findings of some significance suggest that conformity behaviour on a risk taking task exhibits the predicted birth-order effects, but that individual risk taking does not seem to be a dependency-linked behaviour in terms of its sensitivity to ordinal influence, unless family size is introduced as a contextual variable.

From this present study, some points arise which have implications for research in areas of this type.

Studies using birth-order or related variables face extreme methodological problems, particularly in relationship to the subject groups used. The author encountered these, when in selecting subjects for this study from a population of 263 children, five only children were found. Mussen (1960) has mentioned these problems and notes that Koch (1955-56) in standardizing four variables upon a sample of 384 children, ended with twenty-four experimental

groups each of sixteen subjects. Lasko (1954) controlled family variables by studying first and second borns in one family, as did Yoda & Fukatsu (1963). It is suggested that further research in the birth-order area adopts this restricted subject field rather than the more diffuse groupings of the present study. This at least will reduce interprotive ambiguities. However there is the danger that such reductionism may be carried to the absurd. A statistically significant difference between two of many sub groups which are differentiated on many closely controlled variables, may merely produce a psychological significance of "so what?"

Before any generalized theory develops which can satisfactorily synthesise the scattered research into ecological variables, studies will need to widen the population from which subjects are typically drawn. Most studies, with the possible exceptions of Smith and Goodchilds (1963) and Sampson (1962) have been based on university students or young children. If the assumptions on birth-order are tenable, obviously they will be more salient in these years. But if this research is to be of any psychological significance, it surely must show the degree to which these effects

persist once the sibling leaves the nuclear family. The use of adult subjects would also permit more accurate grouping of subjects on family and birth-order variables. By this stage these variables will be less likely to change due to increases in the numbers of younger siblings. Social class variance can be considered to be an important variable, as Rosen (1961) suggests, and future research may wish to examine inter-class differences, once generalized findings reach an acceptable level of consistency.

The question of the only-child remains unresolved. The comparatively small number of studies using this category is indicative of their infrequency in many societies. In this study insufficient were found in a school of 600 children to form a group of twelve, simply controlled for sex and nothing else. Findings of differences between first borns with siblings and only children would pose problems for Schachter's (1959) theory on inconsistent parental responses as the causation of birth-order effects. They could certainly increase the salience of theories which cite sibling interaction and the

frequency of reinforcement of later parent and child interaction as the major determinants.

The present experimental design could be improved, by actually making loss equiprobable over the initial risk taking trials. This session could continue until the subject had reached a specified criterion level of performance - say three consecutive trials with a range + or - 1 from the median.

Some comparison between types of risk seems desirable. The present study operationally presented risk as the possible loss of rewards. The use of a situation which presents possible physical risk e.g. the anticipation of a shock, may show quite different results. It could be plausibly hypothesised that quite substantial sex differences should be noted in this latter case and also conformity differences between public and private performance conditions.

It appears from the foregoing, that studies which examine ecological variables must use sample sizes which are much greater than the Becker et al. (1964, 1966) N = 36 or 48. In fact to allow for adequate numbers of

groups with the required controls, and to be able to have a design sensitive enough to find small but consistent differences, the investigator may need a sample size approaching Chopra's (1966) 1359. While this may be practicable in the case of a group task, it would be a feat of remarkable endurance (on the experimenter's part) in the case of an individual procedure, unless the task was computer controlled.

This raises the problem of the utility of results from birth-order studies. Do they have an applied significance or heuristic value for the science?

The conflicting findings which characterize the field lend more than a tinge of pessimism to a consideration of its potential utility. The limited nature of its value, is, and has been, recognised by many writers. Sears (1950) remarks that ordinal position can only be a starting point for inquiries into individual behaviour, and this point is accepted by Rosenberg and Sutton-Smith (1964). Glass et al. (1963) in stressing that birth-order is an ecological variable, suggest that it will not produce uniform psychological effects among samples of

subjects which differ in other population characteristics, although there may well be considerable uniformity within relatively homogeneous sociological groupings. Murphy et al. (1937) are even more pessimistic. "..... the objective fact of ordinal position in the family, without regard to its meaning to the child, to the siblings, and to the parents, is sure to yield meagre psychological results."

Schachter, recognizes the problem, when he says "Certainly ordinal position, in and of itself, is an unsatisfactory, cataloguing sort of notion. It has no properties, it has no meaning. It must, however, mediate processes and properties which can account for these (the early Schachter) findings."

Certainly research will continue into birth-order and associated variables. Whether or not the return will justify the efforts put into such research is questionable. This writer, for one, remains to be convinced. The gaps, which Schachter noted at the conclusion of his study, still remain evident.

CHAPTER 11

Summary

An experiment was undertaken which examined the effects of birth-order and family size on individual risk taking and conformity behaviours. Previous studies had suggested conformity behaviours, being dependency linked, exhibited ordinal effects. It was considered individual risk taking may prove to be another such dependency linked behaviour.

Ninety-six ten to twelve year-old male and female subjects were exposed to a risk taking task involving individual and social influence conditions, and which had real outcomes for the subject.

Six hypotheses were investigated. First born and later born subjects did not differ in the amount of risk they accepted in an individual situation, until family size was considered as a contextual variable. Subjects from small families accepted less risk than subjects from large families. First born subjects conformed more to hypothetical group norms than later borns. Subjects from small families conformed more than subjects from large families. Two hypotheses relating to grouped sex

differences were tested. Males accepted less risk than females, but there was no difference in conformity behaviour between the sexes.

The discussion suggested that some tentative support existed for viewing risk taking behaviour as dependency linked; that birth-order - conformity relationships could be generalised to a risk taking situation; and that family size was a critical variable in studies involving ecological variables. Attention was also given to the theoretical consistency of the results.

The study was concluded with a critical evaluation of the utility of birth-order and related variables in psychological research.

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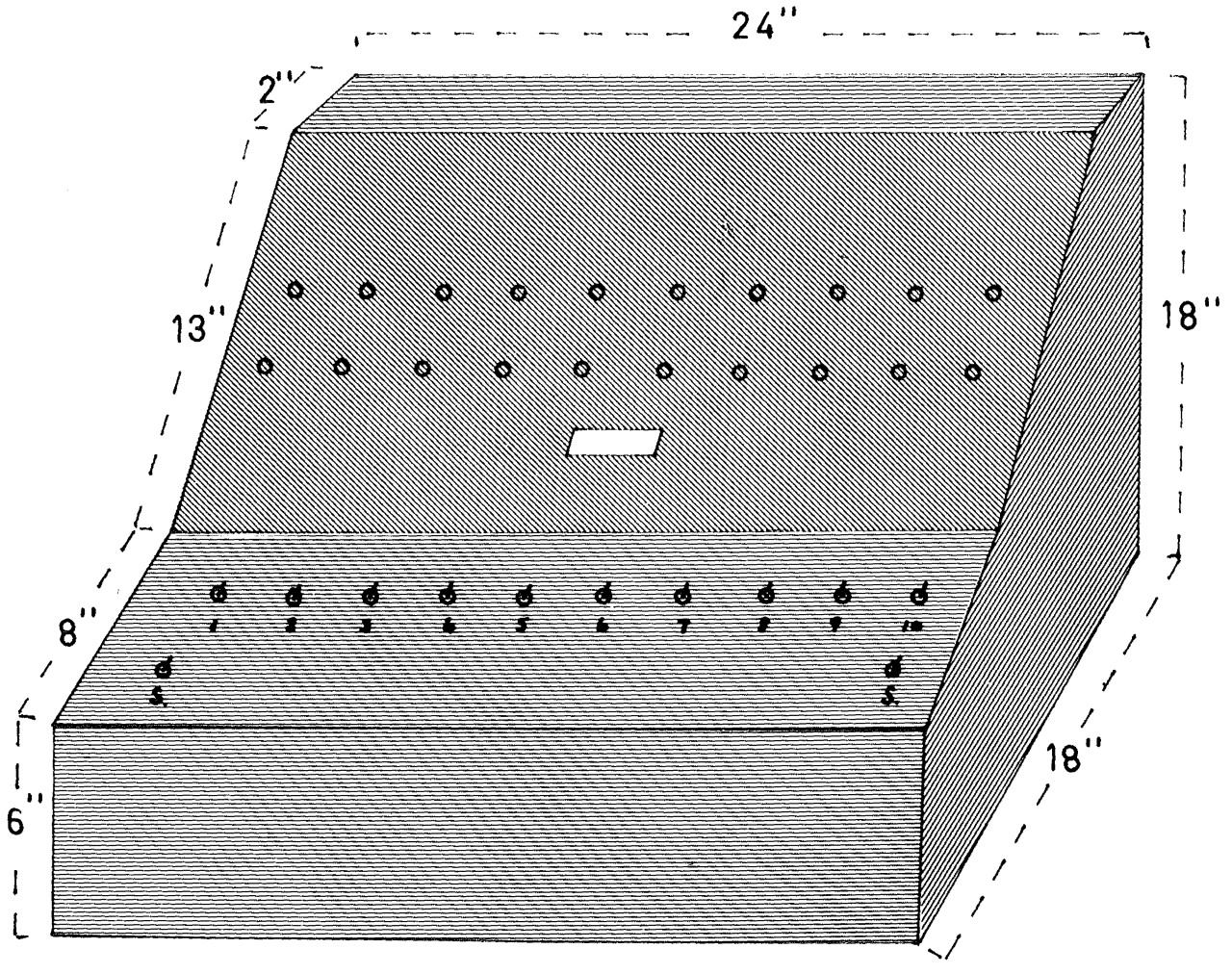
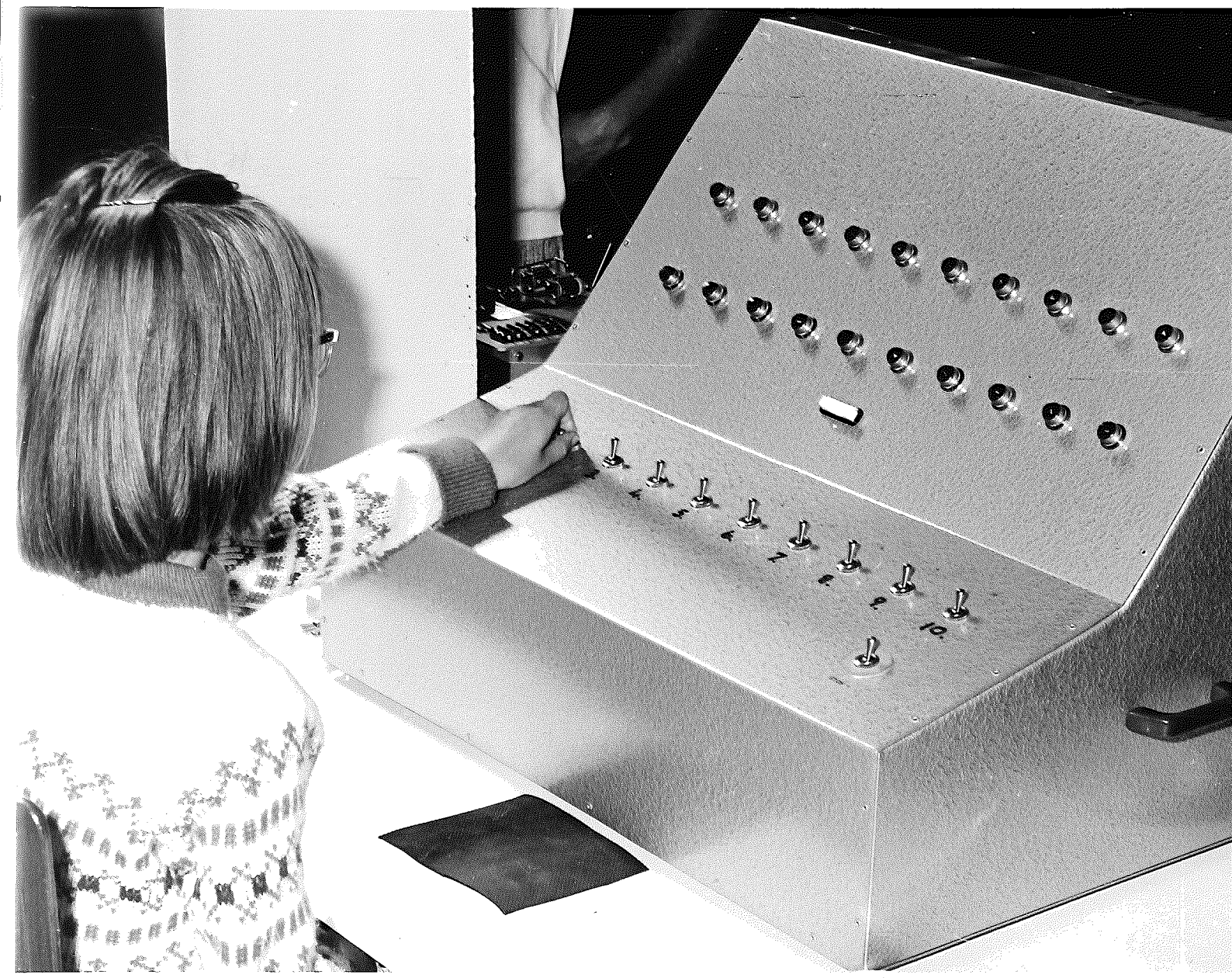
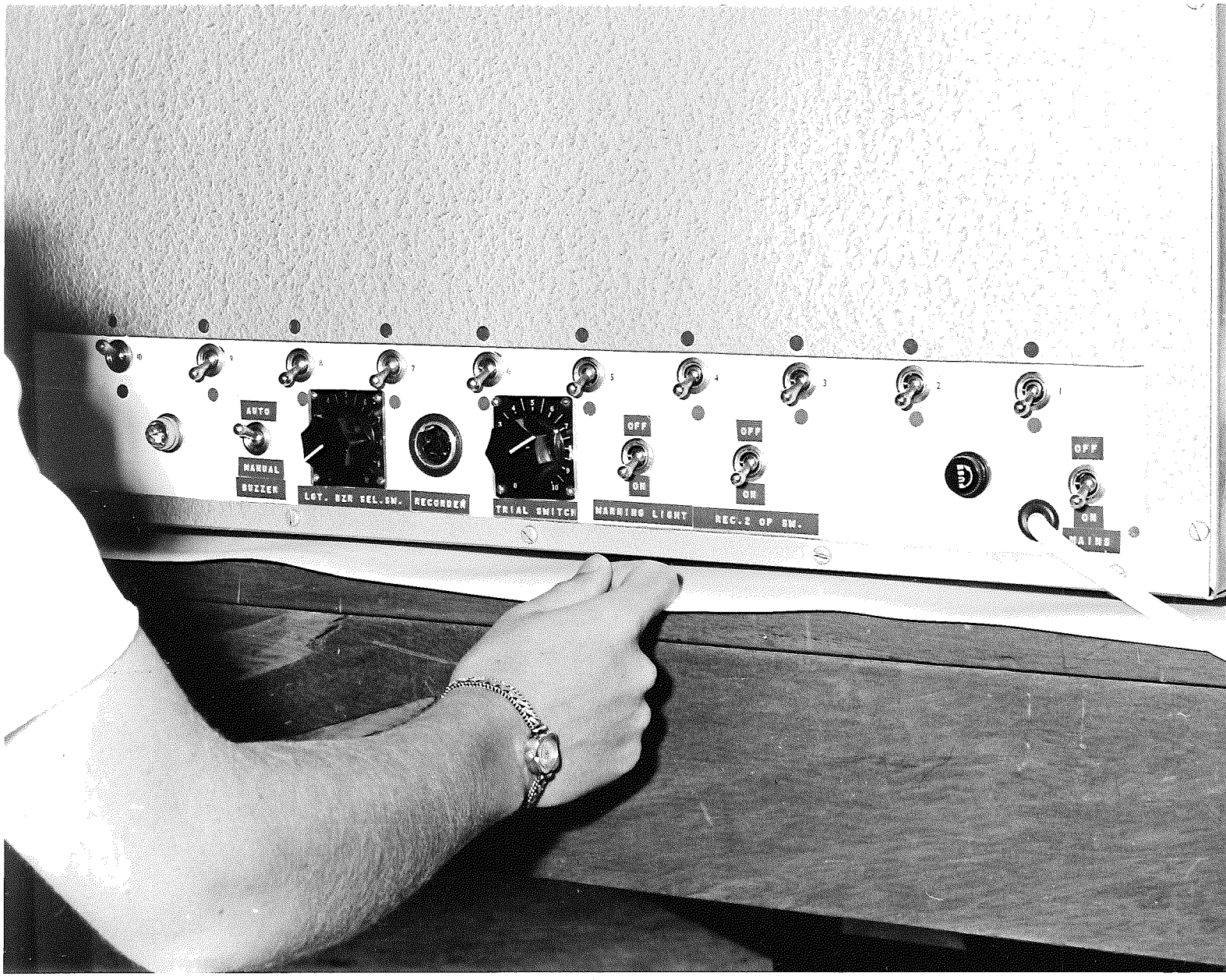
APPENDIX A

Apparatus and Experimental Setting

The Experimental Console.






AUTO
MANUAL
BUZZER
LOT. BZR SEL. SW.
RECORDER
TRIAL SWITCH
OFF
ON
WARNING LIGHT
OFF
ON
REC. 2 OP SW.
OFF
ON
MAINS

APPENDIX B

Standardized Procedure.

1. Learning Session

"_____. Which of these sweets is your favourite? Good. During a game we'll play you'll have the chance to win some _____. While we play, I'll use these counters instead of sweets. Each will be worth one sweet at the end of the game. We won't get messy then.

We are going to play an interesting game with this switchboard. First I'll teach you how to use it. Are you left or right handed? Place your _____ hand on the pad. When the white light flashes, flick switch one with your _____ hand and return it to the pad. Now when it flashes again do the same to switch two and return your hand to the pad. That's right. Now continue along to switch ten waiting for the white light each time."

"Let's do the same thing again. Each time the white light flashes flick the next switch and return your hand to the pad. This time, each time a light flashes you'll receive a sweet. Ready? Watch for the white light."

(This was primarily a response latency trial. Each subject also "won" ten sweets to bargain with later in the experiment).

"You can see that each switch can give either a red or a green light, but never both at any one time. This is important in the game, for from now on, nine switches will give a green light and only one a red light. But you won't know which switch it is each time. We want to see if you can beat the switchboard by avoiding the red light. Remember. The red light can come on any switch.

Let's learn the rules.

You begin by placing a sweet in this dish. Do that. Now watch. When the white light flashes you decide whether to flick switch one or flick either stop switch. If you flick switch one, and a green light comes on, you keep your sweet and earn a bonus sweet and the game goes on. But if a red light comes on you loose any sweets which are in your bowl. If you flick the stop switch, you stop the game and keep your sweet, or any others which are in the bowl. So each time a green light flashes you win a bonus sweet. But a red light means you lose all sweets in the bowl.

Let's have a practice.

Bet a sweet. Hand on the pad.

When the white light goes, flick switch one.

You win a sweet. Bet another one. Watch for the light.

You win another sweet."

(All subjects proceed until they flick switch four).

"Oh! A red light. Had this been in the game, you would have lost seven sweets. But let's go back one. Let's imagine that you decided the risk was too great to continue. The white light flashes on, you flick the stop switch and keep your sweets.

Get the idea?

Remember each time the red light flashes on a different switch, but there will always be one somewhere.

Before you have another practice, look at this card (Figure 1). This shows you, that the further you go, if the switches so far are green, the risk of getting a red light gets greater. You see if it hasn't come by two, it could be any one of the eight which are left. If it hasn't come at six, it could be, now, only one out of four which are left. If it hasn't come by eight,

the red light must be either nine or ten. So the risk increases but also you may win some more sweets if you go on. So you have to decide.

Let's have another practice.

Bet a sweet etc."

(This is repeated during two further practice trials).

"Well now. Where do you think the next red light will come? Why?"

(This tests understanding of equiprobability of occurrence).

"What happens to the risk as you go to the right? Show me."

(This tests understanding of increasing risk for succeeding T + 1 decisions if T was connected to a green light).[1]

2. Individual Condition

"_____. We've finished practising. Now we'll play the game for keeps! When the white light flashes each time you choose whether to continue or stop. Take as much time as you wish to decide.

Bet a sweet.

---

[1] During the learning session the experimenter was demonstrating in synchronization with the standardized spoken procedure.

Watch for the light."

(After three critical trials and two non-critical trials _____).

"Now look at this card. What did you think, when you made your choice to stop?"

3. Social Influence Condition;

"Back to the game. This time I'm going to tell you what other children do just as later I'll be telling other children how you do.[1]

Once again, choose when you see the white light.

For this run, most intermediate school children try to reach switch _____ and then on the next choice they stop the game. But some meet a red light before they reach _____ and lose their sweets."

(This is repeated for trials five and six and omitted for trial five A. Control group subjects did not receive any social influence instructions. Instead the individual condition instructions were repeated).

"Now look at this card. What did you think when you made your choice to stop?"

---

[1] Studies c.f. Allen (1965) Argyle (1957) Bass (1961) suggest conformity influence is greater under conditions of public commitment. The above instruction approximates this implicitly at least.

4. Information Questions:

"_____. This completes the game. While Miss _____ counts your winnings I'd like to ask you some questions.

1. Let's check this sheet. (Appendix C)
2. Are _____ _____ _____ and _____ still living at home?
3. Do you belong to any clubs? Whose idea was this?
4. If you run into some difficulty when you are doing something, what do you prefer to do?
5. In the game what made you choose to stop at the places you did?
6. When you knew what other children had done, did this make your choice easier, harder or just the same? Why?
7. What do you think I wanted you to do?
8. Did you think of anything during the game?[1]
9. What did you know about the game before coming here?

---

[1] Questions 4, 5, 7 and 8 were asked in the above fashion so that the answers would almost approximate free-responses. It is this writer's experience that the questioner usually inadvertently, or otherwise, frames a child's response by the nature of question asked.

Before you go _____ would you please sign this (See Appendix D). You will receive your winnings when all of the others, who will be chosen have had their turn."

APPENDIX C

Questionnaire Sample

Please PRINT your answers:

1. Full Name _____ Form _____

   Room Number _____ Teacher _____

2. What is your age in years? _____

   What date is your birthday? _____

   Are you a boy or a girl? _____

   In which street do you live? _____

   What work does your father do? _____

   Have you any brothers or sisters? _____

   If you have, are you the

   eldest _____

   youngest

   or in between?

   Print the names of your brothers

   and sisters and try to guess

   their ages. _____

   _____

   _____

   etc.

3. Here is a list of sweets. If you like one place a tick beside it. If it is a favourite place two ticks beside it. If you dislike it, place a cross beside it.

   If you neither like or dislike it place an O beside it.

   Chocolates _____ Barley Sugar _____

   Minties _____ Peppermints _____

   etc.

   Have you any other favourite sweets?

   What are they?

APPENDIX D

Data Sheet Sample.

Name	_____	I.O.	_____
Group	_____	Ach.Rat.	_____
Age	_____	Fath. Occup.	_____
Ord. Pos.	_____		
Family Size	_____		
Years to Sib.	_____		
Years from Sib.	_____	Norm Order	_____
Sex of Sibs.	_____	Losses	_____

Decision Times

	Resp. Lat.	T_1	T_2	T_3	T_4	T_5	T_6
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							

Last Switch

Questions

1.

2.

3.

4.

5.

6.

7.

8a.

b.

I agree not to talk about this game with other children until the rewards are given out.

Signed _____.

APPENDIX E

Individual Subjects' Results

Group	Subject & Sex		No. of Final Switch Chosen T_1	T_2	T_3	Deviation from Norms (T_4 - T_6) N_3	N_5	N_8	Confidence Ratings CR_1	CR_2
F.B.O. (Small)	A	M	2	2	2	2	2	5	4	4
	B	M	4	5	8	6	5	1	4	3
	C	M	2	2	3	1	0	0	3	5
	D	M	6	3	6	0	0	1	1	4
	E	M	2	6	4	0	0	1	3	4
	F	M	6	8	3	2	0	1	3	4
	G	F	6	4	3	0	1	1	4	4
	H	F	4	6	4	3	0	2	3	2
	I	F	5	2	3	2	1	0	3	4
	J	F	4	5	4	0	1	1	3	3
	K	F	4	5	6	0	1	0	4	5
	L	F	7	7	6	1	1	0	2	3
F.B. (Large)	A	M	9	10	8	0	0	1	3	3
	B	M	3	3	4	1	1	3	2	3
	C	M	10	9	8	4	4	2	3	3
	D	M	3	3	4	3	0	3	4	4
	E	M	3	4	6	2	1	1	3	4
	F	M	2	4	5	3	2	4	2	3
	G	M	8	9	8	3	2	0	3	2
	H	F	4	5	6	6	4	1	3	2
	I	F	10	9	9	6	4	1	3	4
	J	F	5	4	4	0	1	4	2	4
	K	F	9	9	9	6	4	1	3	3
	L	F	6	5	6	3	3	2	3	3
Youngest (Small)	A	M	6	7	9	6	4	0	3	3
	B	M	2	2	5	2	4	2	3	4
	C	M	4	5	6	2	1	1	3	5
	D	M	6	5	6	0	0	0	3	5
	E	M	4	4	5	3	0	2	3	3
	F	M	1	2	3	2	1	3	3	3

Group	Subject & Sex		No. of Final Switch Chosen T_1	T_2	T_3	Deviation From Norms (T_4 - T_6) N_3	N_5	N_8	Confidence Ratings CR_1	CR_2
	G	F	3	6	7	1	3	1	3	3
	H	F	6	8	6	4	0	1	3	3
	I	F	2	1	2	1	1	4	3	3
	J	F	4	6	5	3	2	2	3	2
	K	F	2	4	4	6	2	0	2	3
	L	F	6	7	10	4	1	3	3	4
Youngest (Large)	A	M	5	4	8	2	1	1	3	3
	B	M	5	5	3	5	1	3	4	4
	C	M	6	6	7	4	2	0	3	4
	D	M	8	8	6	6	4	1	4	5
	E	M	3	4	7	5	3	3	3	4
	F	M	6	6	7	4	2	1	4	4
	G	F	4	6	5	2	2	1	3	3
	H	F	8	7	6	4	2	2	3	3
	I	F	6	3	4	5	4	2	3	2
	J	F	2	2	3	1	0	1	3	4
	K	F	9	7	5	7	3	1	4	3
	L	F	9	9	10	6	4	1	2	4
2nd, 3rd (Large)	A	M	4	6	8	5	4	2	3	3
	B	M	3	3	4	0	1	3	3	4
	C	M	3	4	5	0	2	3	4	5
	D	M	4	4	4	2	1	4	3	4
	E	M	0	2	4	1	3	9	3	2
	F	M	7	7	8	6	3	0	4	3
	G	F	4	4	6	2	3	3	3	4
	H	F	8	9	10	0	1	1	2	5
	I	F	5	3	4	5	4	1	3	4
	J	F	9	6	8	4	3	0	3	3
	K	F	7	9	7	4	0	4	4	4
	L	F	9	5	3	2	2	4	3	3
4th Plus (Large)	A	M	9	8	9	3	2	0	2	3
	B	M	9	9	7	1	2	2	3	4
	C	M	0	1	4	6	2	3	4	4
	D	M	5	4	7	2	3	0	3	3
	E	M	3	2	2	1	0	2	3	3
	F	M	10	6	9	5	3	1	3	3

Group	Subject & Sex		No. of Final Switch Chosen T_1	T_2	T_3	Deviation from Norms (T_4 - T_6) N_3	N_5	N_8	Confidence Ratings CR_1	CR_2
	G	F	2	6	5	7	1	0	3	4
	H	F	7	10	4	1	1	3	4	3
	I	F	9	4	8	3	3	1	2	4
	J	F	4	4	5	2	2	2	2	3
	K	F	9	8	9	5	4	0	4	3
	L	F	8	7	9	0	1	0	4	4
2nd (Small)	A	M	2	2	3	0	2	4	4	3
	B	M	2	5	9	6	4	1	3	5
	C	M	4	3	7	2	1	0	4	3
	D	M	4	5	5	3	1	2	3	3
	E	M	3	4	4	6	4	1	4	4
	F	M	4	6	6	2	1	3	2	3
	G	F	5	5	8	5	2	0	1	3
	H	F	2	3	6	4	2	0	4	4
	I	F	10	9	9	6	4	1	3	4
	J	F	4	2	2	4	3	1	3	5
	K	F	3	7	4	0	2	0	3	2
	L	F	5	9	8	5	5	1	3	4
Control	A	M	4	3	2	4	4	4	3	2
	B	M	6	5	5	5	6	5	3	2
	C	M	4	4	6	5	7	6	5	4
	D	M	5	6	8	7	7	5	3	2
	E	M	5	5	5	6	7	8	4	3
	F	M	8	8	7	6	5	4	5	3
	G	F	4	2	3	6	5	4	4	5
	H	F	10	3	5	8	9	8	3	4
	I	F	6	4	4	3	5	3	3	2
	J	F	8	8	9	8	8	10	3	2
	K	F	8	8	7	5	4	3	4	5
	L	F	7	8	8	7	6	7	4	3

APPENDIX F

Expected Family Size

An inquiry was addressed to the Department of Statistics concerning the mean expected number of siblings which a New Zealand family produces during its life history. No information, apart from the average number of dependents at a given time, could be obtained. For this reason a derived expected mean was calculated, using statistics available for 1963.

Net Reproduction Rate = 1.796 (1963)

(N.R.R. = the no. of female children expected from a woman's child bearing years).

Male : Female Birth ratio = 1.062 : 1.000 (1963)

Thus expected family size = $\frac{1.062}{1} \times 1.796 + 1.796$

$= 3.703$

This is a useful statistic in terms of ecological comparisons as it includes offspring who are no longer dependents of the wage earner, a group which do not feature in available statistics.